THIRD FIVE-YEAR REVIEW REPORT FOR JENNISON-WRIGHT CORPORATION SUPERFUND SITE GRANITE CITY, MADISON COUNTY, ILLINOIS

Prepared by

Illinois Environmental Protection Agency
Springfield, Illinois

for the

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

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Signed by: DOUGLAS BALLOTTI

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TABLES AND ATTACHMENTS

ABBREVIATIONS & ACRONYMS

ACM	asbestos containing material
ARAR	applicable or relevant and appropriate requirement
AST	aboveground storage tank
Bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
COPC	contaminant of potential concern
CUO	cleanup objectives
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
ERA	ecological risk assessment
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GAC	granular activated carbon
HRC	hydrogen releasing compound
ICs	institutional controls
Illinois EPA	Illinois Environmental Protection Agency
LTRA	long-term response action
MCL	maximum contaminant level
MW	monitoring well
NAPL	non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	Operation and maintenance
NPL	National Priorities List
OU	Operable Unit
OWS	oil water separator
PAH	polyaromatic hydrocarbon
PCP	pentachlorophenol
PLC	process logic controller
Ppb	parts per billion
Ppt	parts per trillion
RAO	remedial action objective
ROD	Record of Decision
RPM	Remedial Project Manager
Site	Jennison-Wright Corporation Superfund Site
SVOC	semivolatile organic compound
TACO	Tiered Approach to Corrective Action Objectives
TBC	to be considered
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin (dioxin)
TEQ	toxic equivalency quotient
µg/L	micrograms per liter
UECA	Uniform Environmental Covenants Act
UST	underground storage tank
UU/UE	unlimited use/unrestricted exposure
VOC	volatile organic compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The Illinois Environmental Protection Agency (Illinois EPA) prepared this FYR for the United States Environmental Protection Agency (EPA) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (Title 40 of the Code of Federal Regulation (CFR) Section 300.430(f)(4)(ii)) and considering EPA policy.

This is the third FYR for the Jennison-Wright Corporation Superfund site (Jennison-Wright site or the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site, as defined in the 1999 Record of Decision (ROD), consisted of five operable units (OUs). Because the remedial action selected in the ROD was a Sitewide remedy, since the first FYR report in 2009, EPA has described the Site as having all remedial actions taking place under one OU. The entire Site is addressed in this FYR.

The Jennison-Wright Superfund Site FYR was led by Christopher Hill, Remedial Project Manager (RPM), Illinois EPA. Participants included Jay Timm, Community Relations Coordinator, Illinois EPA; Tony Warren, Corrective Action Contractor, REACT Environmental (REACT) (contractor to the Illinois EPA); and Mary Tierney, RPM, EPA. The review began on January 4, 2019.

Site Background

The Jennison-Wright site is the location of a former wood-treating facility. The 20-acre property is located at 900 West 22nd Street in Granite City, Madison County, Illinois, approximately 6 miles northeast of downtown St. Louis, Missouri (Attachment B). The area surrounding the Site is a mixed residential-industrial neighborhood. The Site is bisected by 22nd Street and is bordered on the south and east by Norfolk and Southern Railroad, on the north by 23rd Street, and on the west by an unnamed alley running behind the houses of a residential neighborhood (Attachments C and D). An Illinois-American Water Company waterworks facility is immediately north of the Site. Currently, the Site is vacant except for the building that houses the groundwater treatment system. It is anticipated that future use of the Site will be either commercial or industrial use.

The former facility treated wooden railroad ties and wood blocks using creosote, pentachlorophenol (PCP), and zinc naphthenate. Jennite®, an asphalt sealant product composed of coal tar pitch, clay and water, was also manufactured at the Site. The manufacturing process areas were located on the southern portion of the Site, south of 22nd Street. The northern portion of the Site, north of 22nd Street, was used to store raw lumber and to dry and store treated railroad ties and wood blocks. The southern portion of the Site contained both an aboveground and buried railcar that had been used to dispose of waste

creosote and PCP. Several contaminated soil stockpiles were located throughout the Site. An area in the northeast corner of the Site, called Area H, the 22nd Street Lagoon, and the Jennite® Pit were all used as on-site disposal areas where manufacturing wastes were dumped. Other features in the southern part of the Site included the transite building, the Jennite® building with two storage silos, the tank farm (including the two railcars), the creosote process area (green building and concrete basin), the PCP process area, sawmills, office, and other operations buildings. See Attachment E for historical Site features. Operations at the Site began prior to 1921 and continued until 1989.

A preliminary investigation conducted by Illinois EPA in 1988 showed subsurface contamination in soil and groundwater. Through visual observation and laboratory analyses, the presence of contaminated soil throughout the unsaturated zone was identified primarily in three areas – the 22nd Street Lagoon, Jennite® Pit, and PCP Process Area. See Attachment F for soil contamination areas. Soil contamination in the remainder of the Site was found at various depths ranging from 1 to 5 feet below ground surface (bgs). Six soil borings completed in 1991 showed the presence of discolored oil in groundwater.

After these preliminary investigations, Illinois EPA conducted an Engineering Evaluation and Cost Analysis (EE/CA) in January 1994 and found:

- Significant sources of contamination in drums and tanks;
- Dioxins/furans and carcinogenic polyaromatic hydrocarbons (PAHs) in surface soils;
- PCP in groundwater in the PCP Process Area;
- PAHs, benzene, PCP, arsenic, 2,4-dimethylphenol and naphthalene in groundwater under the 22nd Street Lagoon;
- Benzene and naphthalene in subsurface soils;
- Structurally unsound on-site buildings and silos; and
- Four on-site buildings containing regulated asbestos containing material (ACM).

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Jennison-Wright Corporation Superfund Site		
EPA ID: ILD006282479		
Region: 5	**State:** IL	**City/County:** Granite City/Madison
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: Illinois EPA		

Author name (Federal or State Project Manager): Christopher Hill
Author affiliation: Illinois EPA
Review period: January 4, 2019 – May 31, 2019
Date of site inspection: January 4, 2019
Type of review: Statutory
Review number: 3
Triggering action date: June 13, 2014
Due date *(five years after triggering action date)*: June 13, 2019

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Past practices at the Jennison-Wright site resulted in the release of chemicals to surface soils. In the case of the Jennite® Pit and the 22nd Street Lagoon, waste was deposited directly into subsurface pits. Once released, contamination migrated to subsurface soils and groundwater. Table 1 shows contaminants of potential concern (COPCs) identified in the ROD for each media – surface soil, subsurface soil and groundwater.

TABLE 1: CONTAMINANTS OF POTENTIAL CONCERN BY MEDIA TYPE

Contaminant	Surface Soil	Subsurface Soil	Groundwater
Acenaphthene	x	x	x
Benzene		x	x
Benzo(a)anthracene	x		x
Benzo(a)pyrene	x	x	
Benzo(b)fluoranthene	x	x	x
Benzo(k)fluoranthene	x	x	x
Beryllium	x		
Carbazole	x	x	
Chloroform			x
Chromium	x		
Chrysene	x	x	x
Di(2-ethylhexyl)phthalate			x
Dibenzo(a,h)anthracene	x	x	
1,2-Dichloroethane			x
2,4-Dimethylphenol		x	x
Ethylbenzene			x
alpha-Hexachlorocyclohexane	x		x
Indeno(1,2,3-cd)pyrene	x	x	

Lead	x		x
Manganese	x		x
Methylene chloride			x
2-Methylphenol			x
Naphthalene	x	x	x
Pentachlorophenol	x	x	x
Phenol			x
2,3,7,8 TCDD Equivalents (dioxin)	x		
Thallium			x
Toluene			x

COPCs in soil included phenols, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (dioxin), and semivolatile organic compounds (SVOCs), most of which are PAHs. Benzo(a)pyrene was detected in soil samples at a maximum concentration of 2,800,000 µg/kg, and naphthalene was detected at concentrations up to 4,200,000 µg/kg. PCP was detected in soil at concentrations up to 670,000 µg/kg. Dioxins, which were associated with waste PCP material, were detected in soil at a toxic equivalency quotient (TEQ) of up to 66 µg/kg.

Groundwater contained phenols and PAHs, as well as volatile organic compounds (VOCs) such as benzene, xylenes, and toluene. The most significant areas of shallow groundwater contamination identified were in the northeast corner of the south portion of the Site near the 22nd Street Lagoon and in the former PCP Process Area. Phenol was detected in groundwater at concentrations up to 9,800 µg/L, PCP at concentrations up to 88,000 µg/L, and naphthalene at concentrations up to 21,000 µg/L. PCP concentrations are significantly lower in intermediate groundwater samples, suggesting limited downward migration of PCP in groundwater occurred at the Site. See Attachment G for figure showing areas of PCP-contaminated groundwater.

During the EE/CA, Illinois EPA collected 81 gridded surface soil samples, 15 biased surface soil samples, 72 subsurface soil samples, four sediment samples, and 58 groundwater samples from three different depths – shallow (20 feet bgs), intermediate (20-45 feet bgs), and deep (45-100 feet bgs). Contamination was also found in groundwater in all three depth intervals, and a significant amount of non-aqueous phase liquid (NAPL) source area was observed in the northeast corner of the southern portion of the Site.

A risk assessment was performed to estimate the health or environmental problems that could result if the proposed actions were not completed. The general conclusion of the human health risk assessment was that the Site posed unacceptable risks to human health in both current- and future-use scenarios. Therefore, remedial action was warranted. Factors causing the unacceptable risks to humans included:

- The presence of dioxins/dibenzofurans and carcinogenic PAHs in surface soil;
- The presence of PAHs and PCP in groundwater; and
- The presence of benzene and naphthalene in subsurface soils.

The ecological risk assessment (ERA) was prepared based on information collected by Illinois EPA during the Site characterization investigation from July through September 1997. Federal and state

agencies were consulted for information on sensitive habitats and protected species near the Site and relevant maps were reviewed to identify nearby sensitive habitats. In addition, information was obtained from a local Illinois Department of Natural Resources representative who visited the Site. A quantitative ecological risk evaluation for the Jennison-Wright site was not performed because the findings of the ERA indicated Site conditions were not likely to adversely impact wildlife. The conclusions of the ERA were:

- Habitat at the Jennison-Wright site is of very low quality to wildlife;
- The Site is located in a mixed industrial/residential area. Only common wildlife, accustomed to human activity and disturbance, are likely to use the Site; and
- The closest aquatic resource and ecologically sensitive areas to the Jennison-Wright site are located approximately one mile away and are not likely to be impacted by on-site contamination.

No response actions to address ecological risks were initiated based on the conclusions above and no adverse impacts to wildlife or sensitive habitats were expected to result from contamination at the Site.

Response Actions

Removal Actions

Illinois EPA conducted the first removal action at the Jennison-Wright site in May 1992. Using bankruptcy trust funds, Illinois EPA initiated a stabilization effort to prevent the spread of contamination. The contents of the Jennite® Pit located at the east boundary of the south portion of the Site had become semi-liquid and had begun to migrate off-site. To temporarily alleviate the problem, the overflowing material was removed and placed in three cutoff tanks. A temporary clay cap was constructed using on-site materials to shore up the sides of the Jennite® Pit. Approximately 175 drums of known and unknown materials were found on the Site including 15 drums of creosote-contaminated asbestos insulation. These drums were stored on-site in an existing structure.

Work accomplished during the removal included removal of 22 cubic yards of ACM, pumping of 1,300 gallons of creosote-contaminated water to an aboveground storage tank (AST), excavation and temporary on-site storage of creosote, tar, and contaminated soil that had migrated off-site from the Jennite® Pit.

Illinois EPA initiated a second removal response on November 8, 1994 and completed it on March 6, 1995. This action implemented the recommendations in the 1994 EE/CA, which included:

- Installation of a 6-foot tall chain link fence around the area of stockpiled soil and drainage area at the northeast corner of the Site;
- Excavation and disposal of soils around the upright storage tanks and railroad cars;
- Removal of aqueous waste from the various storage vessels, treatment by oil/water separation, and off-site disposal at a water treatment plant;
- Removal and disposal of creosote waste material from the storage vessels;
- Decontamination/dismantling of the storage vessels;
- Characterization of the material within the drums inside the transite-sided building and proper disposal;
- Installation of a protective geomembrane and clay cap over the Jennite® Pit; and

- Removal of the contaminated soil in the three cutoff tanks in the south portion of the Site and dismantling of the tanks.

As part of a third removal action in 2003, Illinois EPA demolished on-site buildings, removed ASTs, underground storage tanks (USTs) and debris piles, and constructed a permanent decontamination pad on the southern portion of the Site.

Remedial Action Objectives

EPA placed the Jennison-Wright site on the National Priorities List (NPL) on June 17, 1996 and completed a ROD in 1999. The ROD referred to five OUs: soils and wastes, NAPL, groundwater, buildings, and miscellaneous items. The remedial action selected, however, was a Sitewide remedy. Because the OUs were used primarily as management tool and because the remedy selected was for the entire Site, since the first FYR in 2009 the Site has been referred to as one OU.

Based on the identified applicable or relevant and appropriate requirements (ARARs) and to-be-considered (TBC) requirements and the need to reduce the potential threat to human health and the environment, the following general remedial action objectives (RAOs) were developed for the Jennison-Wright site:

- Prevent current nearby residents and potential future workers from contacting, ingesting, or inhaling on-site soil and waste materials containing COPCs that exceed the calculated risk-based cleanup objectives;
- Prevent the continued release of contaminants to groundwater;
- Initiate long-term groundwater restoration to federal maximum contaminant levels (MCLs);
- Abate regulated ACM present in the on-site buildings;
- Remove listed hazardous waste from the Site for treatment and disposal at an appropriately licensed facility;
- To the extent practical, pump NAPL from the subsurface in the vicinity of the 22nd Street Lagoon; and
- Treat collected groundwater.

Decision Documents and Selected Remedy

The main components of the remedy selected in the September 1999 ROD were:

- For Site wastes consisting of the drip track residue and the oils found on-site, remove the waste and dispose of it at a hazardous waste facility;
- For Site soils, a land farm could be constructed in the northeast portion of the Site. This component of the remedy was changed to excavation and off-site disposal in the October 2005 Explanation of Significant Differences (ESD);
- For NAPL removal, hot water flushing;
- For the more highly contaminated groundwater plumes, enhanced *in situ* biological treatment using oxygen releasing compound and air sparging;
- Monitored natural attenuation was the selected alternative for the other areas of the Site where groundwater contamination was at a much lower concentration;
- The buildings and other structures on the Site would be razed and the ACM inside would be abated; and

- Miscellaneous items, such as debris piles, storage tanks, abandoned steel trams and several sumps and pits were to be removed from the Site.

As indicated above, an October 2005 ESD modified the soil remediation method from landfarming treatment in an on-site treatment unit to excavation and off-site disposal of contaminated soil. The excavated areas would then be backfilled with clean material and seeded.

A June 2009 ESD modified the remedy to include:

- institutional controls (ICs) for soil and groundwater[1]
- the use of a different substrate to enhance *in situ* groundwater bioremediation,
- excavation of soils beneath 22nd Street,
- extraction and off-site disposal of NAPL from the Jennite® Pit, and
- identification of a contingency remedy[2] for potential additional NAPL and groundwater contamination in the Jennite® Pit area.

Cleanup Objectives

Site-specific cleanup objectives (CUOs) were established in the ROD for soil and groundwater. Site-specific CUOs for soil were based on future commercial or industrial use of the Site and represented the 10^{-5} risk level for carcinogens or a hazard quotient of 1 for noncarcinogens. The groundwater CUOs selected in the ROD were based on future drinking water or commercial use and represent the 10^{-6} level for carcinogens or a hazard quotient of 1 for noncarcinogens or the MCL. The two exceptions to these rules were the groundwater CUO for arsenic and the soil CUO for dioxin. The site-specific CUO for arsenic in groundwater was set at 50 µg/L, which was the MCL at the time of the ROD. For dioxin in soil, the 10^{-5} risk level was calculated to be 0.2 µg/kg. However, based on a review of documentation from the Agency for Toxic Substances and Disease Registry (ATSDR), a site-specific CUO of l µg/kg was selected. This number is the same as 1 part per billion (ppb) TEQ.

Tables 2 and 3 show the site-specific CUOs proposed in the 1999 ROD for soil and groundwater, respectively. Attachment H shows the same lists of site-specific CUOs but also includes the Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) Tier 1 values for comparison purposes.

[1] Prior to the 2009 ESD, the only IC required was a zoning restriction to ensure the property continued to be used for commercial and industrial purposes. The additional ICs required by the 2009 ESD included requirements to prohibit excavation of soils and/or restrict groundwater use in the following areas: to the west of the Site in the alley, along the section of 22nd Street near the eastern border of Site, in the northeast corner of the Site, and along the eastern border of Site between 22nd Street and southern boundary of Site. The ESD required that groundwater use restrictions would be needed on all on-site areas where groundwater cleanup objectives had not yet been met.

[2] The 2009 ESD stated that if additional investigation showed that NAPL and contaminated groundwater were located beneath the former Jennite® Pit area, hot water injection wells and NAPL extraction wells would be installed in the area, and the NAPL and contaminated groundwater would be treated in the existing groundwater treatment plant.

Table 2: CUOs for Soil

Contaminant	CUO (ug/kg)
Benzene	3,000
Benzo(a)anthracene	14,000
Benzo(a)pyrene	2,000
Benzo(b)fluoranthene	22,000
Benzo(k)fluoranthene	32,000
Naphthalene	27,000
Carbazole	954,000
Dibenzo(a,h)anthracene	2,000
Indeno(1,2,3-cd)pyrene	11,000
PCP	51,000
TCDD	1

Table 3: CUOs for Groundwater

Contaminant	CUO (ug/L)
Arsenic	50
Benzene	10
Benzo(a)anthracene	0.13
Benzo(b)fluoranthene	0.18
Benzo(k)fluoranthene	0.4
Chrysene	4
PCP	1.0
Alpha-BHC	0.03
Manganese	200
Naphthalene	400
2,4-dimethylphenol	200
2-methylphenol	500

Status of Implementation

Illinois EPA completed the remedial design in 2003. That same year, several components of the remedy, including demolition of on-site buildings and removal of ASTs, USTs and debris piles, were completed as part of a third removal action.

The remedial action started a year later, in September 2004, and was completed in September 2009. Drip track residues and oils were removed from the Site and disposed of appropriately. Soil from both the northern and southern parcels were excavated in accordance with the October 2005 ESD. Illinois EPA completed the excavations of the 22nd Street Lagoon, the Jennite® Pit and portions of 22nd Street. Groundwater remediation activities have included groundwater sampling and injections of hydrogen releasing compound (HRC) in the PCP contaminant plume, along with the on-going hot water injection and extraction of NAPL and contaminated groundwater in the vicinity of the 22nd Street Lagoon. For this component of the remedy, which was referred to as "NAPL removal via hot water flushing" in the 1999 ROD, groundwater extracted from the area near the 22nd Street Lagoon is treated using an oil/water separator (OWS), clay adsorption, and granular activated carbon (GAC) before being discharged to the Granite City wastewater treatment plant via the municipal sewer system. Collected NAPL is shipped off-site for disposal.

Three rounds of HRC injections were completed in the PCP Process Area in 2009. The injections were designed to span the horizontal and vertical extent of the PCP groundwater contaminant plume to maximize the anaerobic treatment of PCP.

The Site has been fenced and long-term groundwater monitoring has been conducted since completion of the remedial action.

In 2017, Illinois EPA regraded the storm water retention basin area in the southern portion of the Site. In 2018, Illinois EPA completed Site grading and construction of the new OWS system. The groundwater restoration remedy is now in long-term response action (LTRA). See Attachment I for Site photos.

Institutional Controls

Planned and implemented ICs for the Jennison-Wright site are shown in Table 4.

Table 4: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Entire Site	Yes	Yes	North and south parcels	Limit future Site use to commercial/industrial.	Environmental Covenant under the Illinois Uniform Environmental Covenants Act (UECA) (planned)

Area east of the eastern Site border extending from 22nd Street to southern boundary	Yes	Yes	South parcel	Prohibit excavation of soil and prohibit groundwater use.	Environmental Covenant under Illinois UECA (planned); Granite City Drinking Water Ordinance #7529 (7/17/2001; See Attachment J)
Former drip track area in the vicinity of 22nd Street along the eastern boundary	Yes	Yes	North parcel	Prohibit excavation of soil in the area.	Environmental Covenant under Illinois UECA (planned)
Area H (northeast corner of the Site)	Yes	Yes	North parcel	Prohibit excavation of soil in Area H.	Environmental Covenant under Illinois UECA (planned)
Groundwater on-site and off property (the alley on the western border and the areas east of the eastern border	Yes	Yes	North and south parcels	Prohibit well drilling, use of groundwater as drinking water, and exposure to groundwater with contaminant levels above cleanup objectives.	Granite City Drinking Water Ordinance #7529 (7/17/2001; See Attachment J)
Alley adjacent to the western boundary of southern portion	Yes	Yes	South parcel	Prohibit groundwater use and land use (prohibit excavation and disturbance of cover).	Environmental Covenant under Illinois UECA (planned); Granite City Drinking Water Ordinance #7529 (7/17/2001; See Attachment J)

A map showing the area in which the ICs apply is included in Attachment K. Note that the attachment shows soil and groundwater "management zones." These zones represent the most highly contaminated soil and groundwater areas. To be protective, ICs will put into place for these highly-contaminated zones along with contaminated areas outside the zones. The map in Attachment K does not show all the areas for which ICs are in place or the areas outside of those zones. Preparation of a map showing all of these areas will be one of the follow-up actions of this FYR.

Current Compliance: No indications of trespassing or of any uses of the Site that would be inconsistent with the planned ICs were observed during the Site inspection. Staff that operate the groundwater treatment system are at the Site five days a week and have reported no misuse of the Site property. There are no known uses of groundwater as a source of drinking water in the vicinity of the Site. An Illinois EPA website, http://epadata.epa.state.il.us/land/gwordinance/municipality.asp, which provides the status of groundwater ordinances used as environmental ICs, states:

"Ordinance approved. No MOU required. The Agency's [Illinois EPA's] survey of approved groundwater ordinances confirms that this ordinance remains valid for use as an environmental institutional control pursuant to 35 Ill. Adm. Code 742 as of April 2010."

Long Term Stewardships of ICs: Long-term protectiveness requires compliance with effective ICs. Long-term stewardship (LTS) procedures will be developed to ensure that the remedy continues to function as intended with regard to ICs. The procedures will be summarized in a stand-alone LTS Plan or will be incorporated into the Operation and Maintenance (O&M) Plan and will include regular evaluation of ICs at the Site and annual certification to EPA that ICs are in place and effective.

IC Follow up Actions Needed: A map showing all ares that require ICs should be prepared, and ICs pursuant to the Illinois UECA should be implemented at the Site in order to ensure no exposures to contaminated soil or groundwater occur and to ensure that the remedy is not negatively impacted. In addition, an LTS Plan is needed to ensure that ICs remain in place and are regularly monitored.

Systems Operations/Operation & Maintenance

A draft O&M Plan completed in 2010 outlines the requirements related to maintenance of the groundwater treatment system. The O&M tasks include:

- Operation of groundwater treatment system
- Routine inspections of groundwater treatment system and completion of weekly logs
- Collection of influent and effluent sampling
- Recording of temperature, flow rates, pressures, cycles, water levels and gallons discharged
- Performance of maintenance activities to ensure continued operation of the groundwater treatment system, such as extraction well cleaning, movement of pumps and packers in extraction and injection wells, and electrical and mechanical servicing of equipment
- Submittal of quarterly reports
- Submittal of documents as directed by Illinois EPA

As noted in the Site Inspection Checklist (Attachment O), an updated O&M Plan will be prepared to reflect the requirements of the newly-upgraded groundwater treatment system.

Since 2014, Illinois EPA has completed routine groundwater monitoring. Monitoring wells that are sampled quarterly since 2014 include MW5S, MW5D, MW6M, MW6D, MW8S, MW8M, MW17S, MW18S, MW20, MW21, MW22, and MW23. During 2014, 2015 and 2016, EX1 and EX2 were also monitored quarterly. Additional wells, including MW2S, MW8D, MW10S, MW11S, MW11M, MW12S, MW13S, MW14S, MW15S, MW16S, MW19S, have been sampled generally once per year since 2015. Groundwater samples are typically analyzed for 20 SVOCs and PCP.

A number of additional tasks to improve overall remedy operation and Site security were conducted between 2014 and 2018. A summary of these actions is below.

Fence Repair: In 2014, Illinois EPA cleared brush and weeds, regraded the fence line around the entire Site perimeter and replaced damaged areas of fence, top rail, barbed wire and posts. Fencing was used to patch gaps between gates not being used. Approximately 70% of the fence was repaired during this

process. Additional "No Trespassing" signs were installed along with chemical hazards signage. In addition to mowing, routine maintenance now includes fence-line trash and debris removal, weeding and trimming, and repairs to fencing, as needed.

Extraction Well Vaults: During heavy rain events, the injection area would flood causing water to fill the two extraction well vaults. The vaults contained electrical panels for extraction pumps. When flooded, the panels would cause the pump's electrical panel to trip and shut the pumps down. Over time, the underground panels became severely corroded and ceased to function correctly.

For operational and safety reasons, Illinois EPA has removed the two electrical panels located in the extraction well vaults and replaced them with National Electrical Manufacturers Association 4 boxes, mounted aboveground. One electrical panel still needs to be upgraded.

Water Supply Lines: The hot water supply lines to the well boxes were repaired due to corrosion and leakage.

Process Logic Controller (PLC): The original PLC began to fail in 2016. Several ports were non-functional and not reporting nonessential alarms to the auto dialer. The PLC could not be repaired, and the programming logic was considered obsolete. Illinois EPA contract personnel had noticed the system was injecting two to three times as much water as it was extracting, causing a mounding effect in the groundwater in the treatment area and possible migration of contamination away from the treatment area. Illinois EPA's contractor proposed upgrading the PLC to allow for programming changes that would eliminate the groundwater mounding and instead allow a cone of depression to form drawing more contaminated groundwater into the treatment system. A new PLC was installed when the new OWS was installed in 2018. The new system allowed the injection of hot water in one-hour on/one-hour off intervals and allowed groundwater extraction to run continuously. Current flow meter readings are showing a two to three times extraction compared to injection rate, resulting in an approximate 200 percent increase in contaminated groundwater extraction.

Heating of Boiler Room: As part of the new OWS installation, Illinois EPA installed a 5,000-watt electric heater in the boiler room. Prior to this, the boiler room was not heated, and during extreme cold weather there was a possibility of pipes in the boiler room freezing and bursting in the boiler ever shut down for an extended period of time.

Venting of Building: Illinois EPA installed building fan timers to ensure that fans run in the treatment building from 5:00 AM to 6:00 PM Monday through Friday, which are the times when personnel are most likely to be present.

Area H: Illinois EPA removed the rock ditch checks from the northern portion of the Site and placed the rock between the low-lying area in the northern side of the Site and Area H. Soil, concrete, and rock from the construction of the new OWS building was also used to build out the wall along Area H.

Injection System Filter Bag Canisters: Both of the injection system filter bag canisters had become severely corroded and had begun to leak. This was affecting system performance and creating slip hazards and electrical hazards due to their proximity to the systems electrical panel. Both canisters were replaced.

Extraction Well Header Repair: The large extraction well head developed a leak due to a hairline crack. Illinois EPA removed and replaced the damaged fitting.

Site Grading: The area in the vicinity of the extraction and injection wells was regraded to provide better drainage during rain events.

III. PROGRESS SINCE THE LAST REVIEW

Tables 5 and 6 show the protectiveness determination and the status of recommendations from previous FYRs, respectively, from the 2014 FYR.

Table 5: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The JW [Jennison-Wright] site remedy is protective of human health and the environment in the short term because there are no complete exposure pathways at the Site and all remedial components are in place and operating. However, in order for the remedy to be protective of human health and the environment over the long term, an undersized NAPL treatment component must be replaced; the storm water retention area should be regraded to make the side slopes less steep; ICs must be fully implemented to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems, and prohibit the future residential use of the property; and a risk analysis should be conducted to determine the impact of EPA's 2012 change in the non-cancer toxicity factor for dioxin.

Table 6: Status of Recommendations from the 2014 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1/ Sitewide	ICs need to be placed on the Site to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems,	Develop an environmental covenant under UECA.	Ongoing	Ongoing. EPA and Illinois EPA met in March 2019 to restart the process of completing environmental covenants.	NA

	and prohibit the future residential use of the property.				
1/ Sitewide	The OWS for the NAPL/water treatment system is undersized.	Illinois EPA should replace the OWS with a properly sized unit.	Completed	Illinois EPA completed installation of the new OWS in 2018.	2/14/2018
1/ Sitewide	The storm water retention area may be unsafe.	Illinois EPA should regrade the storm water retention area to decrease the steepness of the side slopes.	Completed	Illinois EPA completed the recommended activities in March 2017, removing dense vegetation and increasing the holding capacity of the basin in the process.	3/28/2019
1/ Sitewide	EPA changed the non-cancer dioxin toxicity factor in 2012.	Illinois EPA should conduct a risk analysis to the impact of EPA's 2012 change in the non-cancer toxicity factor for dioxin.	Ongoing	Not yet completed. Illinois EPA will evaluate the data and determine if the change in the non-cancer toxicity factor affects the long-term protectiveness of the remedy.	NA

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

Illinois EPA published a notice announcing the start of the third FYR in the *Granite City, Madison County Addition* on Wednesday, May 8, 2019 (Attachment L). The public was invited to submit comments or concerns to either Illinois EPA or EPA. The notice also informed the citizens that the results of the review and the report will be made available at the information repository located at the Granite City Public Library, 2001 Delmar Avenue, Granite City, Illinois 62040. No requests for information were received prior to publication of this FYR.

Data Review

Illinois EPA and EPA reviewed NAPL removal, soil contamination, groundwater monitoring data, and vapor intrusion information. Summaries of these reviews are provided below.

NAPL Removal

NAPL is removed from the Site through a system of six hot-water injection wells placed along the NAPL plume boundary and two groundwater/NAPL extraction wells centered within the injection well network. The extraction wells pump contaminated groundwater and recovered NAPL to the treatment system that consists of a phase separation step (an OWS) where the NAPL is separated from the water by specific gravity. Recovered NAPL is stored for off-site disposal. Separated groundwater is then treated by clay adsorption and GAC to remove dissolved metals and organic compounds. Most of the treated water is then sent to the hot-water generation system to be injected into the NAPL plume and the remainder is discharged to the Granite City wastewater treatment plant under a permit.

The total amounts of NAPL removed each year between 2013 and June 2019 are shown below.

- 2013: 914 lbs
- 2014: 957 lbs
- 2015: 1,360 lbs
- 2016: 1,047 lbs
- 2017: 1,704 lbs
- 2018: 12,379 lbs
- 2019[3]: 16,022 lbs

System performance is effective in terms of the hot water injection being able to mobilize a fair amount of NAPL for recovery. Prior to 2018 the OWS was undersized and could not fully separate the NAPL from contaminated groundwater. Installation of a larger OWS was completed in 2018 and the resultant removal of SVOCs has been significant, as indicated in the 2018 annual total (12,379 lbs) and the half-year total for 2019 (16,022 lbs) shown above. The amount of NAPL extracted in 2018 was over twice the total amount extracted in the previous five years. Illinois EPA continues to adjust the system to find optimum operating conditions and maximize NAPL removal, but initial results indicate the system will be much more effective at removing NAPL from groundwater.

Soil Contamination

High levels of COPCs remain in soil in the northeast corner of the Site (Area H), along 22nd Street, and in the southern portion of the Site. The contaminated soil in the southern portion is near the 22nd Street Lagoon, Jennite® Pit, and PCP Process Area. The four sections below summarize sampling data collected by the Illinois EPA contractor in 2008, along with their recommendations, related to Area H, 22nd Street, the PCP Process Area, and the alley adjacent to the western Site boundary in the vicinity of the PCP Process Area. The purpose of the 2008 sampling was to further define the extent of soil contamination, compare the sampling results to CUOs, outline additional soil excavation that may be needed, and define the areas where ICs would be required. The findings from these investigations are summarized in two reports – *Technical Memorandum: Soil Investigation Report*, Ecology & Environment Engineering, Inc., January 27, 2009, and *PCP Process Area Analytical Results and Recommendations*, Ecology & Environment Engineering, Inc., January 22, 2009. Soil sampling locations and proposed excavation areas for the PCP Process Area are shown in Attachment M. Attachment N shows the other soil sampling locations, and Attachment O shows the other proposed excavation areas.

Soil Contamination – Area H

Nine soil samples were collected from 1 to 2 feet bgs from the drainage ditch in the Area H during the December 2008 sampling event. Two of the nine soil samples (AH-1 and AH-2) showed exceedances of site-specific CUOs for eight PAHs. The exceedances ranged from 62,000 ug/kg of dibenzo(a,h) anthracene at AH-2 to 81,000,000 ug/kg of napthalene at AH-1. The concentration of PCP in AH-2 was 12,000 ug/kg, compared to the site-specific CUO for PCP of 51,000 ug/kg. Because of the high concentrations of PAHs in sample AH-1, the amount of PCP could not be quantified and was listed as "not detected" with a detection limit of 1,600,000 ug/kg.

Only one of the nine soil samples (AH-5) was analyzed for dioxin. A concentration of 73 ppt dioxin was detected in AH-5. This concentration is below the site-specific CUO of 1,000 ppt and the EPA screening level of 720 ppt for commercial/industrial use. Although the other eight soil samples were

[3] For the period from January 1 through June 30, 2019.

not analyzed for dioxin, because PCP, PAHs, and dioxin have historically been found to be co-located at the Jennison-Wright site, it can be instructive to compare PCP and PAH concentrations. The concentration of PCP found in AH-5 was listed as "not detected" with a detection limit of 810 ug/kg. The concentrations of PAHs detected at estimated levels in AH-5 ranged from 13 to 35 ug/kg. In comparison, samples AH-1 and AH-2, which were not analyzed for dioxin, contained PCP at concentrations of 12,000 ug/kg (AH-1) and "non-detect" with a detection limit of 1,600,000 ug/kg (AH-2). The concentrations of PAHs in AH-1 and AH-2 ranged from 61,000 to 81,000,000 ug/kg. Considering the co-location of these contaminants at the Site, it is likely that samples AH-1 and AH-2 contained dioxin at levels significantly greater than the 73 ppt found in AH-5.

Results for samples AH-1, AH-2 and AH-5, along with site-specific CUOs, are shown in Table 7. Results exceeding CUOs are shown in bold font.

Table 7: Soil Sampling Results in Area H (December 2008)[4]

COPC	CUO	AH-1	AH-2	AH-5
Naphthalene	27,000	**81,000,000**	**61,000**	40 U
PCP	51,000	1,600,000 U	12,000 J	810 U
Carbazole	954,000	**26,000,000**	15,000	200 U
Benzo(a)anthracene	14,000	**3,400,000**	**82,000**	16 J
Benzo(b)fluoranthene	22,000	**2,100,000**	**240,000**	35 J
Benzo(k)fluoranthene	32,000	**1,200,000**	**100,000**	13 J
Benzo(a)pyrene	2,000	**1,700,000**	**150,000**	17 J
Indeno(1,2,3-c,d)pyrene	11,000	**720,000**	**120,000**	19 J
Dibenzo(a,h)anthracene	2,000	**260,000**	**62,000**	40 U
Dioxin (TEQ)	1	NS[5]	NS	0.073

Recommendation – Area H: Based on these exceedances, the Illinois EPA contractor recommended that the area around the two samples AH-1 and AH-2 be excavated to a minimum depth of 2.5 feet to prevent further contamination throughout the ditch. The excavation area was estimated to be approximately 100 feet in length by 20 feet in width, and a total volume of 185 cubic yards of contaminated soil would be removed.

Soil Contamination – 22nd Street

Analysis of samples collected during the 2008 investigation showed a number of site-specific CUO exceedances in nine of the 17 soil borings along 22nd Street. Sixteen of the boring locations were based on former locations of four railroad spurs that crossed the street during the time the Site was operating. Samples from two depths – 1 to 2 feet bgs and 3 to 4 feet bgs – were collected at each of the borings along the street. An additional boring was made in the area of the 22nd Street Lagoon for comparison purposes. Samples were collected from four different depths at this boring.

In general, most contamination detected in the soil borings along 22nd Street was at the depth of 1 to 2 feet bgs. In the eight borings furthest to the west (SB1 through SB8), with the exception of two

[4] Concentration units in table are ug/kg.
[5] NS = not analyzed for dioxin.

slight exceedances of the CUO for benzo(a)pyrene at two shallow borings, no other CUO exceedances were observed.

The remaining boring locations along 22nd Street, SB9 through SB16, and the boring in the lagoon area, SB17, indicated exceedances of site-specific CUOs for multiple compounds. Specifically, high concentrations of benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, and dibenzo(a,h)anthracene were detected in shallow soil samples (1 to 2 feet bgs) collected from borings SB9, SB11, SB12, SB13, and SB15. The only CUO exceedance deeper than 2 feet along 22nd Street was an exceedance of the CUO for benzo(a)pyrene at 3 to 4 feet bgs at SB16.

Results from the 1 to 2 feet bgs depth interval for samples SB9, SB11, SB12, SB13, and SB15, along with site-specific CUOs, are shown in Table 8. Results exceeding CUOs are shown in bold font.

Table 8: Results of Soil Sampling Along 22nd Street (1-2 feet bgs) (December 2008)[6]

COPC	CUO	SB9	SB11	SB12	SB13	SB15
Naphthalene	27,000	870	890	640	400	570
PCP	51,000	7,300 U	7,800 U	6,900 U	7,200 U	7,400 U
Carbazole	954,000	3,000	2,100	1,500 J	1,400	560 J
Benzo(a)anthracene	14,000	**15,000**	10,000	**28,000**	**28,000**	**20,000**
Benzo(b)fluoranthene	22,000	**28,000**	**25,000**	**55,000**	**24,000**	20,000
Benzo(k)fluoranthene	32,000	26,000	9,500	20,000	17,000	13,000
Benzo(a)pyrene	2,000	**18,000**	**15,000**	**37,000**	**26,000**	**19,000**
Indeno(1,2,3-c,d)pyrene	11,000	**21,000**	**24,000**	**25,000**	**16,000**	**14,000**
Dibenzo(a,h)anthracene	2,000	**3,600**	**7,100**	**16,000**	**8,500**	**5,300**
Dioxin (TEQ)	1	NS	NS	NS	NS	NS

The boring at the 22nd Street Lagoon, SB17, showed CUO exceedances at all four depth intervals (1-2 feet bgs, 5-6 feet bgs, 9-10 feet bgs, and 15-16 feet bgs). The most significant exceedances were at the deeper intervals, and contamination levels increased with depth. PCP was identified at boring SB17. At the two shallow intervals, concentrations of PCP did not exceed the site-specific CUO. For the two deeper intervals, PCP results were listed as non-detect based on detection limits of 84,000 ug/kg and 300,000 ug/kg.

Results for SB17 from all four depth intervals, along with site-specific CUOs, are shown in Table 9. Results exceeding CUOs are shown in bold font.

Table 9: Results from Soil Boring at the 22nd Street Lagoon (December 2008)[7]

COPC	CUO	SB17 (1-2 ft)	SB17 (5-6 ft)	SB17 (9-10 ft)	SB17 (15-16 ft)
Naphthalene	27,000	2,400	**91,000**	**1,600,000**	**9,600,000**
PCP	51,000	800 J	25,000 J	84,000 U	300,000 U

[6] Concentration units in table are ug/kg.
[7] Concentration units in table are ug/kg.

Carbazole	954,000	1,500	64,000	160,000	430,000
Benzo(a)anthracene	14,000	2,100	**96,000**	**87,000**	**490,000**
Benzo(b)fluoranthene	22,000	7,400	**120,000**	**55,000**	**330,000**
Benzo(k)fluoranthene	32,000	2,700	**50,000**	25,000	**140,000**
Benzo(a)pyrene	2,000	**5,300**	**93,000**	**42,000**	**230,000**
Indeno(1,2,3-c,d)pyrene	11,000	6,400	**62,000**	**15,000**	**86,000**
Dibenzo(a,h)anthracene	2,000	**2,200**	**16,000**	**4,800**	**27,000**
Dioxin (TEQ)	1	NS	NS	NS	NS

Recommendation – 22nd Street: Based on the analytical results, the Illinois EPA contractor recommended excavation of shallow soil along the railroad spurs at 22nd Street. The estimated excavation area along the westernmost spur would be approximately 60 feet long by 20 feet wide. An additional 60-foot by 30-foot area along the central railroad spur in the vicinity of borings SB9 through SB12 would also be excavated. The total volume of contaminated soil to be removed was estimated to be approximately 220 cubic yards. For the high levels of contamination found in SB13, SB15, and SB17, the Illinois EPA contractor indicated that this area had been excavated to the degree that was physically possible. In addition, further digging would be obstructed by subgrade and overhead utilities. For this area, the Illinois EPA contractor recommended the implementation of ICs to prohibit excavation.

Soil Contamination – PCP Process Area

The investigative sampling of the PCP Process Area conducted in 2008 consisted of three test pits located approximately 50-, 75-, and 110-feet south of the previous excavation boundary. Soil samples were collected from each test pit at intervals of 8-feet and 15-feet bgs.

Exceedances of the site-specific CUO for PCP (51,000 ug/kg) were identified in the test pits 50 feet and 75 feet away from the previous excavation. PCP was detected at 8 feet bgs at 500,000 ug/kg and at 15 feet bgs at 110,000 ug/kg. No CUO exceedances of the PAHs were seen in any of the test pits.

Dioxin was detected in all six soil samples, but the site-specific CUO for dioxin was only exceeded in two of the samples. Both of these exceedances were in samples collected 15 feet bgs and were in the test pits 50 and 75 feet away from the previous excavation. The two concentrations in exceedance of the CUO were 1,300 ppt and 4,100 ppt. Other results for dioxin ranged from 320 ppt to 1,000 ppt, with the result of 1,000 ppt being the only one exceeding the EPA screening level for dioxin for commercial/industrial use.

Results for the six soil samples collected in the PCP Process Area, along with site-specific CUOs, are shown in Table 10. Results exceeding the CUOs are shown in bold font.

Table 10: Results of Soil Sampling in PCP Process Area (December 2008)[8]

COPC	CUO	PCP50-8	PCP50-15	PCP75-8	PCP75-15	PCP110-8	PCP110-15
Naphthalene	27,000	7,900	5,500	26,000	11,000	ND	ND
PCP	51,000	47,000	**110,000**	**500,000**	27,000	ND	ND

[8] Concentration units in table are ug/kg.

Carbazole	954,000	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	14,000	320	170	280	99	ND	ND
Benzo(b)fluoranthene	22,000	740	350	450	140	ND	ND
Benzo(k)fluoranthene	32,000	310	150	260	77	ND	ND
Benzo(a)pyrene	2,000	400	170	210	82	ND	ND
Indeno(1,2,3-c,d)pyrene	11,000	480	270	240	130	ND	ND
Dibenzo(a,h)anthracene	2,000	180	86	100	ND	ND	ND
Dioxin (TEQ)	1	1.0	**1.3**	0.7	**4.1**	0.32	0.26

Recommendation – PCP Process Area: Based on these findings the Illinois EPA contractor recommended that an area 47 feet by 100 feet be excavated down to the water table (approximately 18 feet bgs). The estimated volume of PCP-contaminated soil that would need to be excavated was 520 cubic yards. The estimated volume of dioxin-contaminated soil that would be excavated was 1,740 cubic yards.

Soil Contamination – Alley

During the December 2008 sampling, four soil borings were completed in the alley between the western boundary of the Site and the adjacent residential area, and two soil borings were completed along 21st Street, which is perpendicular to the alley. All borings were outside of the Site fence. Samples were collected from four depth intervals: 1-2 feet bgs, 5-6 feet bgs, 9-10 feet bgs, and 12-14 feet bgs. All samples were analyzed for PCP and eight PAHs. Samples from one boring, SB18, were analyzed for dioxin.

Analytical results from the samples collected at the six borings showed no exceedances of the site-specific CUOs for PCP or the eight PAHs that were analyzed. In general, low concentrations of contamination were found in the shallow samples, collected at 1 to 2 feet bgs. The highest PAH concentration was 1,000 ug/kg of benzo(b)fluoranthene at 1 to 2 feet bgs at SB21. PCP was not detected in any of the samples based on detection limits that ranged from 710 to 910 ug/kg.

In the soil boring that was tested for dioxin, SB18, dioxin was present at all four depth intervals. The levels ranged from 580 ppt at 9-10 feet bgs to 740 ppt at 13 to 14 feet bgs. The shallow sample collected from 1 to 2 feet bgs contained dioxin at a concentration of 680 ppt. None of the sample results exceeded the site-specific CUO for dioxin of 1,000 ppt. The sample collected from 13 to14 feet exceeded the EPA screening level (720 ppt) for commercial/industrial use. All four samples exceeded the EPA screening level (50 ppt) for residential use.

Results for the soil samples collected from the four depth intervals at SB18 and comparison of the results to the site-specific CUO, the EPA screening level for commercial/industrial use, and the EPA screening level for residential use are shown in Table 11.

Table 11: Dioxin Results in West Alley Soil Samples and Comparison to Three Screening Levels (December 2008)

Sample Depth (feet bgs)	Concentration (ppt)	Site-Specific CUO (1,000 ppt)	EPA Screening Level (commercial/industrial) (720 ppt)	EPA Screening Level (residential) (50 ppt)
1-2	680	Below	Below	**Above**
5-6	730	Below	**Above**	**Above**
9-10	580	Below	Below	**Above**
13-14	740	Below	**Above**	**Above**

Recommendation – Alley: Because contaminant concentrations in samples collected along the alley near the PCP process area did not exceed site-specific CUOs, the Illinois EPA contractor recommended no soil excavation in this area. However, that recommendation was based on a comparison to the site-specific CUO for commercial/industrial use. Additional sampling may be required to define the extent of dioxin-contaminated soil.

Change in Dioxin Toxicity Value

Because the non-cancer toxicity value for dioxin has changed since the 1999 ROD, the site-specific CUO is now less stringent than EPA's current soil screening level of 720 ppt for commercial/industrial use. On-site sampling data show several locations at depth that exceed this screening level. Illinois EPA will conduct a risk analysis to determine if this change in the dioxin non-cancer toxicity value impacts the long-term protectiveness of the remedy.

Groundwater Monitoring

To date, concentrations of PCP and other COPCs still exceed their cleanup levels. ICs will be needed to minimize potential exposure until the cleanup levels are met. The extent of off-site migration of PCP-contaminated groundwater to the west has not been fully defined.

Quarterly groundwater monitoring was conducted at the Jennison-Wright site from 2014 to 2018. During each year, samples were collected from twelve monitoring wells (MWs) during three of the quarters and from 23 MWs in one of the quarters. The samples were analyzed for 20 SVOCs and PCP. During some quarters, analyses of other phenols, such as 2,4-dichlorophenol and 2,4-dimethylphenol, were also included. Sampling during this five-year period generated more than 5,000 data points. See Attachment P for monitoring well locations and Attachment Q for the most recent results from late 2018. The wells shown in Attachment P that were not sampled during this five-year period include: MW3S, MW3D, MW4S, MW9S, MW9M, and MW9D.

Two sets of COPCs for groundwater are identified in the ROD. One set was identified for the streamlined risk assessment. The second set has some of the same contaminants in the first, but it also has some additional contaminants. CUOs were established for all contaminants in the second list. Table 8 shows COPCs with and without CUOs and contaminants currently monitored.

Eleven contaminants that are currently monitored but which are not identified as groundwater COPCs in the ROD include: 2-methylnaphthalene, acenaphthylene, dibenzofuran, fluorene, phenanthrene, 2,4-dichlorophenol, carbazole, analine, anthracene, fluoranthene, and pyrene. A different set of

12 compounds identified in the 1999 ROD as groundwater COPCs are not currently monitored, as shown in Table 12.

Because there are 11 compounds that are monitored that are not designated as groundwater COPCs and 12 groundwater COPCs that are not monitored, one follow-up action recommended in this FYR is to review the current list of groundwater analytes, remove contaminants from the list if they are not needed, and either begin monitoring the 12 COPCs that have not been included or document why they do not need to be monitored.

Table 12: Contaminants Identified as COPCs (with and without CUOs) and Contaminants Currently Monitored in Groundwater

Contaminant	COPC without a CUO	COPC with a CUO	Currently Monitored
Acenaphthene	X		X
Arsenic		X	
Benzene	X	X	
Benzo(a)anthracene		X	
Benzo(b)fluoranthene	X	X	X
Benzo(k)fluoranthene	X	X	X
Chloroform	X		
Chrysene	X	X	X
Di(2-ethylhexyl)phthalate	X		X
1,2-Dichloroethane	X		
2,4-Dimethylphenol	X	X	X
Ethylbenzene	X		
α-Hexachlorocyclohexane	X	X	
Lead	X		
Manganese	X	X	
Methylene chloride	X		
2-Methylphenol	X	X	
Naphthalene	X	X	X
Pentachlorophenol	X	X	X
Phenol	X		X
Thallium	X		
Toluene	X		
Trichloroethene	X		

Levels of contaminants in groundwater are below CUOs throughout much of the Site. In the northern portion of the Site, groundwater contamination remains above CUOs near Area H (MW2S), which is in the northeast corner. MW2S was sampled annually from 2015 to 2018. Although PCP continues to slightly exceed the CUO at this well, the results for the other compounds have been non-detect.

The other four wells in the northern portion of the Site (MW12, MW13, MW14, and MW15) have also been sampled annually since 2015 and have showed no detections. In the southern portion of the Site, the area that has shown no groundwater contamination is the southernmost point (MW10, MW11, MW19). Annual samples from these three wells have been non-detect since 2015.

The main areas of groundwater contamination are near the 22nd Street Lagoon (MW5S, MW20, MW21, MW22, and MW23), the PCP Process Area (MW8S, MW8M and MW8D), and the area in between the lagoon and the PCP Process Area (MW17S and MW18S). Another well near the PCP Process Area, MW16S, contains contamination but the levels are not as high as in MW17S and MW18S. Attachment G shows the general areas of the PCP groundwater plume.

In the last groundwater sampling event in October 2018, the maximum concentration of PCP (42,600 µg/L) was detected at MW8S, which is in the PCP Process Area. The CUO for PCP is 1 µg/L. The maximum concentration of naphthalene (298,000 µg/L) in October 2018 was detected at MW21, which is near the 22nd Street Lagoon. The CUO for naphthalene is 400 µg/L. Table 13 shows concentrations exceeding the CUO for naphthalene during the October 2018 sampling event. The highest concentration of naphthalene in the monitoring well adjacent to the western alley, MW8, was 110 ug/L in October 2018.

Table 13. Concentrations of Naphthalene in Groundwater Exceeding CUO (October 2018)

Monitoring Well	Concentration (µg/L)	CUO (µg/L)
5S	10,600	400
18S	5,220	400
20	804	400
21	298,000	400
22	7,890	400

After HRC injections were done in 2009, the concentration of PCP in MW8S, near the PCP Process Area, decreased from 720,000 µg/L to 75,000 µg/L. Data were not collected to determine if this decrease was due to biodegradation or physical displacement of the contaminants by the HRC agent. Since that time, PCP concentrations have not decreased significantly and in some cases have increased. Further active measures may be needed to achieve groundwater CUOs in a reasonable timeframe. Table 14 shows the concentrations of PCP in the first quarter of 2014 and in the last quarter of 2018.

Table 14. Concentrations of PCP in Groundwater in Q1/2014 and Q4/2018

Monitoring Well	CUO (µg/L)	Q1/2014 (µg/L)	Q4/2018 (µg/L)
5S	1	880	714
6M	1	ND	33
6D	1	ND	67
8S	1	58,400	42,600
8M	1	ND	8
17S	1	ND	130

18S	1	140	1,650
20	1	ND	ND
21	1	104,000	154,000
22	1	ND	50

Vapor Intrusion

Vapor intrusion can occur when VOCs volatilize out of groundwater into structures and buildings. At the Jennison-Wright site, SVOCs, rather than VOCs, are the primary contaminants in groundwater. The fact that the contaminants in Site groundwater are semi-volatile significantly reduces the potential for vapor intrusion. The screening level for one SVOC found in Site groundwater, naphthalene, is 200 ug/L based on an excess lifetime cancer risk of $1x10^{-5}$ or a hazard quotient of 1. In October 2018, the concentration of naphthalene in the monitoring well adjacent to the western alley, MW8, was 110 ug/L. Phenolic SVOCs such as PCP are not considered to be sufficiently volatile to pose a vapor intrusion risk. The closest residences to the Site are approximately 200 feet away.

Table 15 shows the maximum concentrations each year of the three SVOCs that were consistently detected in MW8S between 2014 and 2018. As stated above, the volatility of PCP is not high enough for it to be considered a vapor intrusion risk.

Table 15. Annual Maximum Concentrations of Three SVOCs in MW8S (2014 to 2018)

COPC	MW8S 2014	MW8S 2015	MW8S 2016	MW8S 2017	MW8S 2018
Naphthalene	282	170	127	66	130
PCP	73,500	117,000	73,600	59,200	100,000
2-Methylnaphthalene	405	249	197	67	140

Although the concentrations of sufficiently volatile SVOCs in the monitoring well close to the residential area are low and SVOCs in general are not highly volatile, because some are present in on-site groundwater at extremely high concentrations, Illinois EPA will be evaluating the potential for vapor intrusion in the residential area to the west of the Site. No vapor intrusion data have been collected to date.

Site Inspection

The inspection of the Site was conducted on January 4, 2019. In attendance were Christopher Hill, Illinois EPA, and Tony Warren, Operations Manager for REACT, Illinois EPA's contractor. The purpose of the inspection was to assess the protectiveness of the remedy. The inspection did not identify any major issues. Site plans and permits were up-to-date and readily available. Site fencing had no breaches and no signs of trespassing were observed. Groundwater monitoring and extraction wells, electric panels, and treatment system pipelines were in good condition. One electric panel in the treatment building will be upgraded so that it is rated for wet conditions. The Illinois EPA contractor noted that the pipelines between the extraction wells and treatment building are constructed of black iron and will require periodic maintenance. The FYR Site Inspection Checklist is included as Attachment R and documents the inspection findings.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Yes, it is generally functioning as intended, although a few issues have been identified. The remedy is currently in LTRA. After the remedy was declared operational and functional in 2010, a review of the operating data showed that the OWS did not have sufficient capacity to treat the volume of NAPL-contaminated groundwater that was being extracted. This was remedied when a larger-scale OWS was installed in 2018. The extraction and treatment system is now functioning as intended, and, in fact, the treatment system removed more than twice as much NAPL during two months in 2018 than it had in the previous four years combined. The NAPL that is recovered is disposed of off-site.

The HRC injections completed in 2009 led to the decrease in the concentration of PCP in groundwater near the PCP Process Area from 720,000 µg/L to 75,000 µg/L. Since that time, however, PCP concentrations have not decreased significantly and in some cases have increased. Further active measures may be needed to achieve groundwater CUOs in a reasonable timeframe. In addition, the extent of off-site migration of PCP-contaminated groundwater to the west has not been fully defined.

Except for in the PCP Process Area, concentrations of dioxin in soil meet the site-specific CUO established in the ROD. However, because of the 2012 revision of the EPA screening level for dioxin for commercial/industrial use, levels of dioxin in soil will be reevaluated to ensure the remedy is still protective. Exceedances of site-specific CUOs for other COPCs were identified in soil in Area H, along 22nd Street, and in the PCP Process Area. Recommendations by the Illinois EPA contractor for additional soil excavation in these areas will be reviewed.

No vapor intrusion data have been collected to date at the Site. However, the low volatility of most SVOCs decreases the potential for vapor intrusion. Because some SVOCs are present in on-site groundwater at extremely high concentrations, however, Illinois EPA will be evaluating the potential for vapor intrusion to determine if the collection of soil gas samples is required.

ICs are required at the Site to limit future use to commercial/industrial uses and to prohibit excavation of soil and groundwater use. The Site is currently vacant and there is no use of groundwater for drinking in the vicinity of the Site. Implementing the necessary ICs will ensure that the remedy remains protective in the long-term. In addition, an LTS Plan will be developed to include procedures for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

No. As stated above, in 2012 EPA issued a revised non-cancer toxicity value of 720 ppt for dioxin for commercial/industrial sue. The site-specific soil CUO for dioxin in the 1999 ROD is 1,000 ppt, based on a commercial/industrial future use scenario. The revision means that the CUO in the ROD is now less stringent than EPA's current soil screening level for commercial/industrial use. Illinois EPA evaluated the revised screening value and the residual dioxin levels in on-site soil. After reviewing past soil sampling data, Illinois EPA identified several sample locations where dioxin levels exceeded the 720 ppt EPA screening level for commercial/industrial use. The exceedances were not in surface soil,

and clean fill is present above each location. Illinois EPA will conduct a risk analysis to determine whether the change in the dioxin non-cancer toxicity value impacts long-term protectiveness of the remedy.

In addition, the potential for risk associated with the vapor intrusion pathway, which was not considered at the time the ROD was completed, will be evaluated. If it is determined that the potential for vapor intrusion exists, soil gas sampling may be conducted.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
None.				
OU(s): 1/Sitewide	**Issue Category: Institutional Controls**			
	Issue: ICs are needed on the Site to prevent the use of groundwater until the cleanup levels are met, prevent the disturbance of contaminated soil remaining in place, maintain the integrity of the remedial and monitoring systems, and prohibit the future residential use of the property.			
	Recommendation: Implement environmental covenants under the Illinois UECA.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	3/31/2021

OU(s): 1/Sitewide	**Issue Category: Institutional Controls**			
	Issue: LTS procedures are needed to ensure that effective ICs are monitored, maintained and enforced.			
	Recommendation: Develop and implement an LTS Plan to include procedures for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	12/31/2021

OU(s): 1/Sitewide	Issue Category: Other			
	Issue: Vapor intrusion pathway was not considered when the ROD was signed in 1999.			
	Recommendation: Conduct a review to determine if there is a potential for vapor intrusion and if collection of soil vapor samples is required.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	6/30/2020

OU(s): 1/Sitewide	Issue Category: Remedy Performance			
	Issue: Extent of off-site migration of contaminated groundwater to the west has not been defined.			
	Recommendation: Define off-site migration of contaminated groundwater to the west.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	6/30/2021

OU(s): 1/Sitewide	Issue Category: Remedy Performance			
	Issue: Groundwater contamination is persistent and, in some cases, has increased since HRC injections were completed in 2009 and extent of off-site migration of contaminated groundwater to the west has not been defined.			
	Recommendation: Evaluate groundwater data to determine if any additional remedial actions should be taken to increase the rate of groundwater cleanup and/or to address off-site migration of contaminated groundwater.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	6/30/2022

OU(s): 1/Sitewide	Issue Category: Remedy Performance			
	Issue: Groundwater contamination is persistent and, in some cases, has increased since HRC injections were completed in 2009 and extent of off-site migration of contaminated groundwater to the west has not been defined.			
	Recommendation: If it is determined that additional remedial actions should be taken to increase the rate of groundwater cleanup and/or to address off-site migration of contaminated groundwater, prepare an ESD and/or ROD Amendment to document the change in remedy.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**

No	Yes	State	EPA	9/30/2022

OU(s): 1/Sitewide	**Issue Category: Remedy Performance**			
	Issue: Groundwater contamination is persistent and, in some cases, has increased since HRC injections were completed in 2009 and extent of off-site migration of contaminated groundwater to the west has not been defined.			
	Recommendation: Implement additional groundwater remedial action if required by an ESD and/or ROD Amendment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2024

OU(s): 1/Sitewide	**Issue Category: Other**			
	Issue: The dioxin non-cancer toxicity factor was revised.			
	Recommendation: Conduct a risk evaluation to determine if long-term protectiveness is compromised due to the change in the dioxin non-cancer toxicity factor.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2020

OU(s): 1/Sitewide	**Issue Category: Remedy Performance**			
	Issue: Exceedances of EPA screening levels for dioxin for commercial/industrial use and for residential use were observed in soil borings collected from the alley to the west of the Site adjacent to the residential area.			
	Recommendation: Conduct additional sampling to define the extent of dioxin-contaminated soil in the alley.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2021

OU(s): 1/Sitewide	**Issue Category: Remedy Performance**
	Issue: Exceedances of EPA screening levels for dioxin for commercial/industrial use and for residential use were observed in soil borings collected from the alley to the west of the Site adjacent to the residential area.
	Recommendation: Determine if the EPA screening level for residential use or commercial/industrial use should be applied to the results of soil sampling in the alley and if soil excavation is required in this area.

Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	State	EPA	3/31/2022

OU(s): 1/Sitewide	Issue Category: Remedy Performance			
	Issue: Site-specific CUOs for soil are exceeded in several areas of the Site.			
	Recommendation: Review recommendations for additional soil excavation made by Illinois EPA contractor and determine if additional excavation is necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	12/31/2020

OU(s): 1/Sitewide	Issue Category: Remedy Performance			
	Issue: Site-specific CUOs for soil are exceeded in several areas of the Site.			
	Recommendation: If additional soil excavation is necessary, prepare an ESD and/or ROD Amendment to document the change in remedy.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2022

OU(s): 1/Sitewide	Issue Category: Remedy Performance			
	Issue: Site-specific CUOs for soil are exceeded in several areas of the Site.			
	Recommendation: Implement additional soil excavation if required by an ESD and/or ROD Amendment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2023

Other Findings

In addition, the following are recommendations were identified during the FYR, but do not affect current nor future protectiveness:

- Prepare a map showing all areas where ICs are needed.
- Prepare an updated O&M Plan to specify routine maintenance activities for the upgraded groundwater treatment system and to include information about long-term groundwater monitoring.

- Review list of groundwater COPCs identified in the ROD and list of COPCs currently monitored, add COPCs identified in ROD to lab analyses or document why the contaminant(s) are not being analyzed, and remove contaminants from lab analyses if not needed.
- Prepare concentration vs time graphs for the main COPCs in groundwater and perform statistical trend analyses for those COPCs and MWs where the type of trend is not clear.
- Conduct an evaluation of the monitoring well network to see if any additional wells are required.
- Collect samples from MW9S, MW9M, and MW9D to monitor concentrations of contaminants in groundwater near the Jennite® Pit.
- Evaluate condition of MW3S, MW3D, and MW4S, which are adjacent to the western fence line, and collect samples if the wells are in good condition and if data would be helpful in defining the western extent of groundwater contamination in these areas.
- Continue to adjust hot water injection system, groundwater extraction, and groundwater treatment system to optimize performance.
- Continue to complete minor regrading of low areas as they are identified after heavy rains.

VII. PROTECTIVENESS STATEMENT

OU1 and Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy at the Jennison-Wright Superfund site is currently protective of human health and the environment because there are no complete exposure pathways at the Site and remedial components are in place and operating. However, in order for the remedy to be protective of human health and the environment in the long-term, the following actions need to be taken to ensure protectiveness: ICs: Implement an environmental covenant under the Illinois UECA and develop and implement an LTS Plan. Vapor Intrusion: Conduct a review to determine if there is a potential for vapor intrusion and if collection of soil vapor samples is required. Soil: Conduct a risk evaluation to determine if long-term protectiveness is compromised due to the change in the non-cancer toxicity factor for dioxin; conduct additional sampling to define the extent of dioxin-contaminated soil in the alley; determine if EPA screening level for residential use or commercial/industrial use should be applied to the results of sampling in the alley; determine if soil excavation is required in the alley; review recommendations for additional soil excavation made by Illinois EPA contractor and determine if additional excavation is necessary; if additional soil excavation is necessary, prepare an ESD and/or ROD Amendment to document the change in remedy; and implement additional soil excavation if required by an ESD and/or ROD Amendment. Groundwater: Define off-site migration of contaminated groundwater to the west; evaluate groundwater data to determine if any additional remedial actions should be taken to increase the rate of cleanup; if it is determined that additional remedial actions should be taken to increase the rate of groundwater cleanup and/or to address off-site migration of contaminated groundwater, prepare an ESD and/or ROD Amendment to document the change in remedy;

and implement additional groundwater remedial action if required by an ESD and/or ROD Amendment.

VIII. NEXT REVIEW

The next FYR report for the Jennison-Wright Superfund site is required five years from the completion date of this review.

ATTACHMENT A

REFERENCES

REFERENCES

1999 - U.S. EPA. Record of Decision, Jennison-Wright Superfund Site.

2005 - U.S. EPA. Explanation of Significant Difference, Jennison-Wright Superfund Site.

2008 - Ecology & Environment Engineering, Inc. Remedial Action Design, Jennison-Wright Superfund Granite City, Illinois.

2009 - Ecology & Environment Engineering, Inc. Technical Memorandum: Soil Investigation Report, Jennison-Wright Superfund Granite City, Illinois.

2009 - Ecology & Environment Engineering, Inc. PCP Process Area Analytical Results and Recommendations, Jennison-Wright Superfund Granite City, Illinois.

2010 - GRB Environmental Services Inc. Title Search Report, Jennison-Wright Superfund Site.

2011 - U.S. EPA. Construction Completion Report, Jennison-Wright Superfund Site.

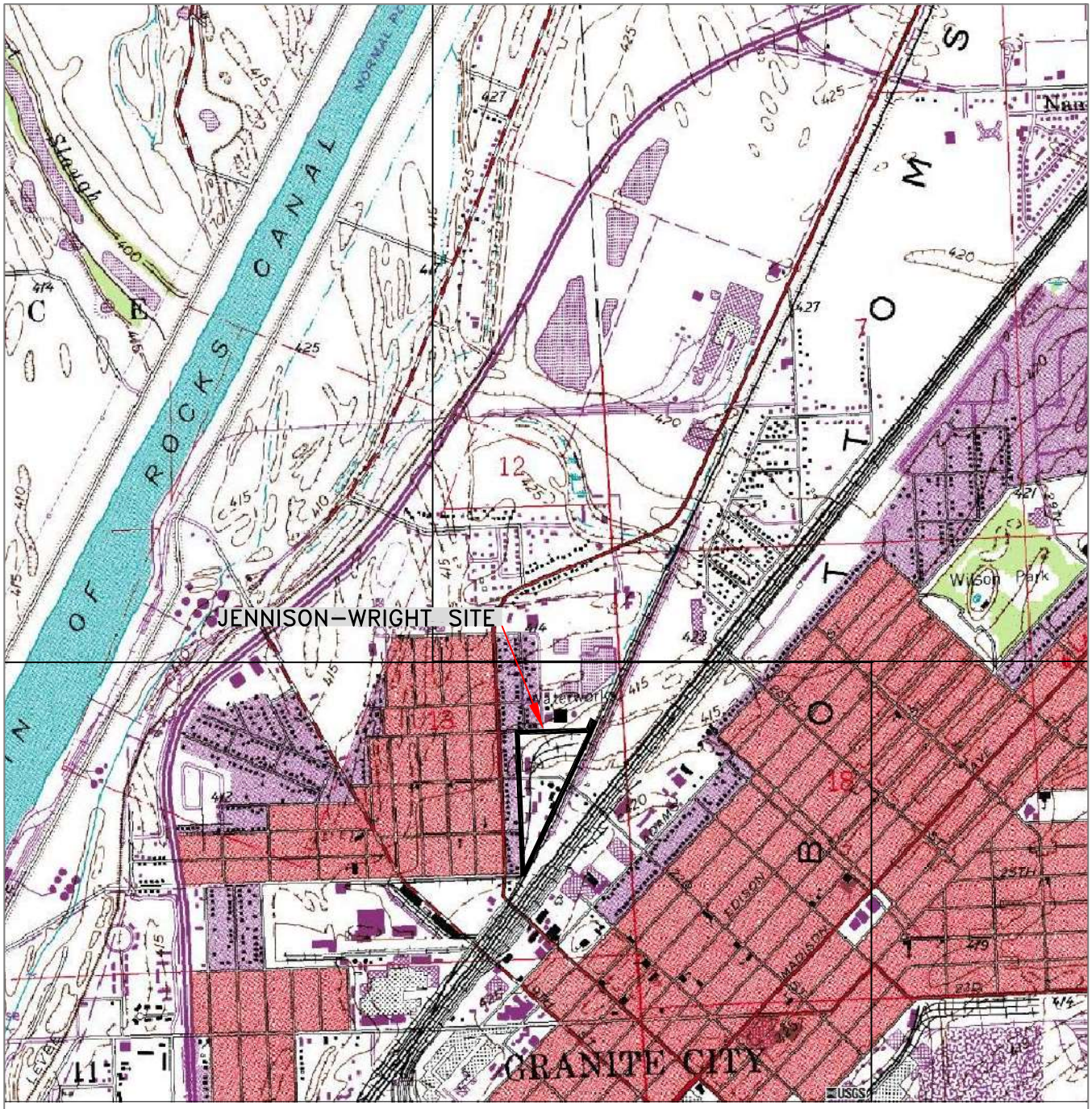
2014 - U.S. EPA. Second Five-Year Review Report, Jennison-Wright Superfund Site.

2014, 2015, 2016, 2017 and 2018 - Illinois EPA, Groundwater monitoring data.

2017 - Toeroek & Associates. Title Search Report, Jennison-Wright Superfund Site.

ATTACHMENT B

SITE LOCATION



N

SCALE 1: 24000

1 1/2 0 1 MILE

1 0 1000 2000 3000 4000 5000 6000 7000 FEET

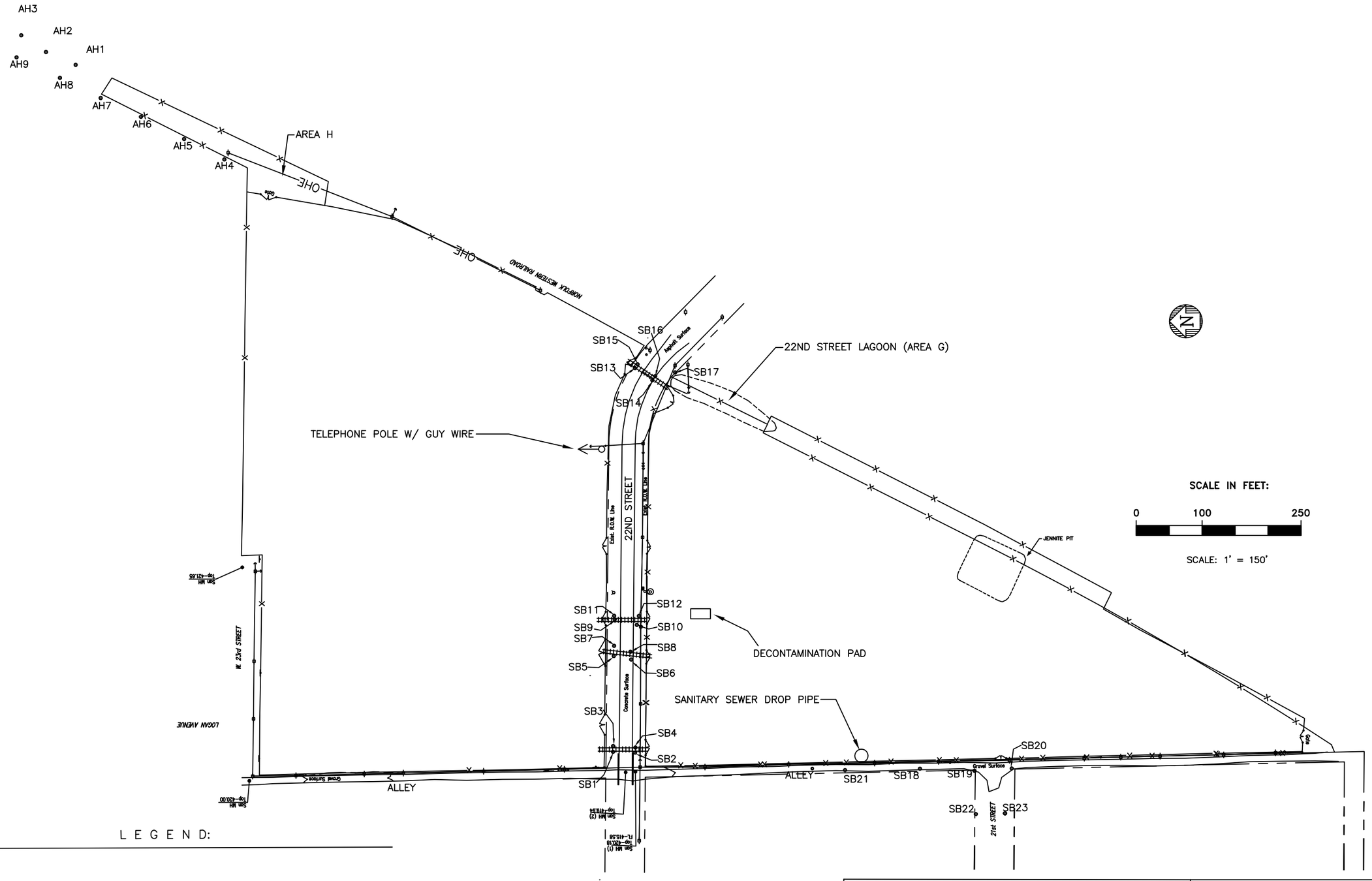
1 .5 0 1 KILOMETER

ecology and environment, inc.

FIGURE 2–1 – SITE LOCATION MAP
JENNISON–WRIGHT SITE
GRANITE CITY, ILLINOIS

ATTACHMENT C

SITE FIGURE



L E G E N D:

● – SOIL SAMPLE LOCATION

ecology & environment engineering, inc.
International Specialists in the Environment

FIGURE 1
2008 SOIL SAMPLE LOCATION

DESIGNED BY	CHECKED BY
T. CAMPBELL	J. JENKINS
DRAWN BY	APPROVED BY
V.GEE	N. BROWN

JENNISON–WRIGHT SITE
GRANITE CITY, ILLINOIS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
SEE ABOVE	01/2009	IE1P_GP_FSP 012109	1	

ATTACHMENT D

AERIAL PHOTO SHOWING THREE MAIN SITE PARCELS

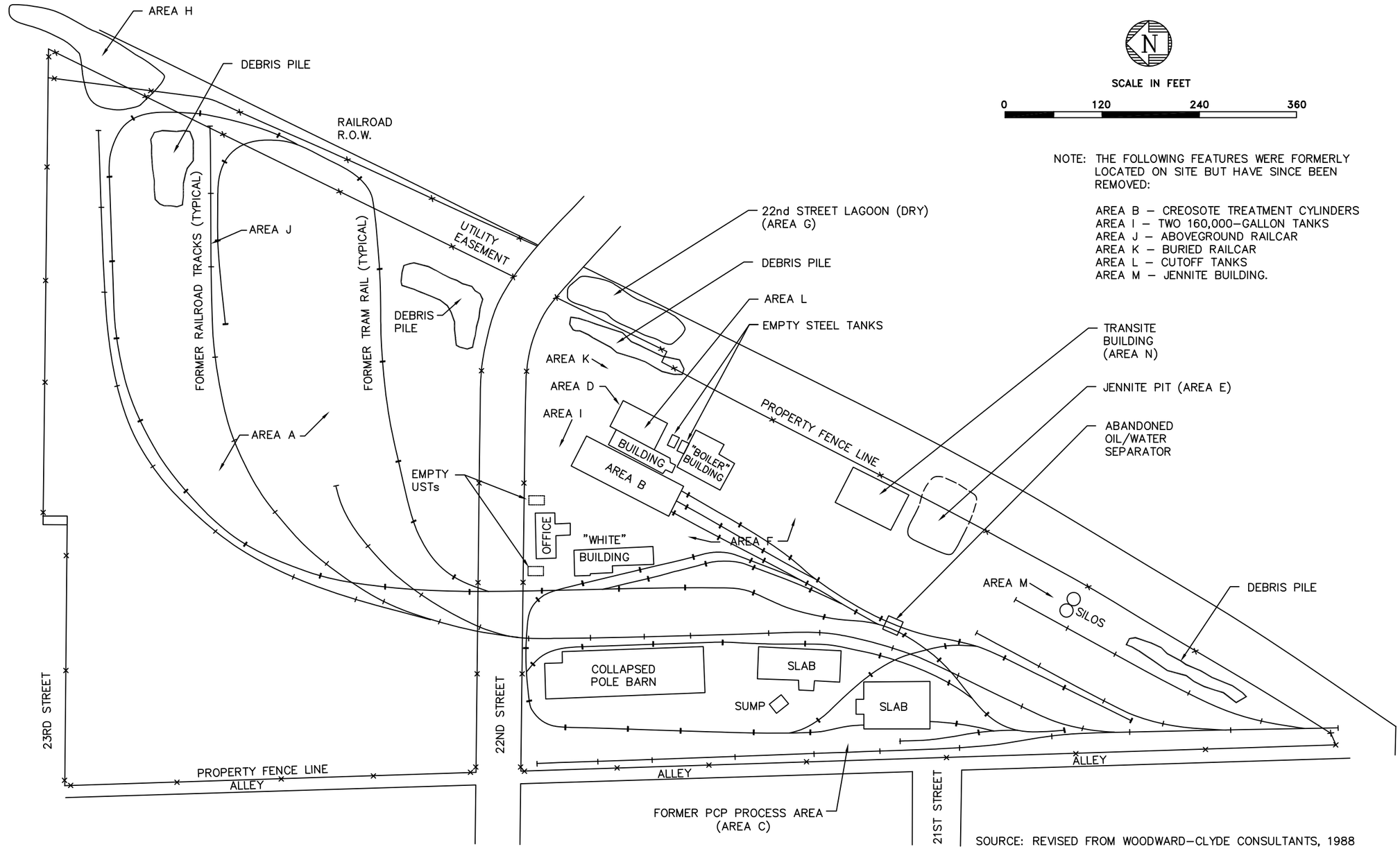
Jennison-Wright Site

Addresses:

- **899 West 22nd Street, Granite City, Madison County, Illinois 62040**
  - **22-1-19-13-16-401-001**
- **900 West 22nd Street, Granite City, Madison County, Illinois 62040**
  - **22-1-19-13-16-401-002**
  - **22-1-19-13-20-401-001**

ATTACHMENT E

HISTORICAL SITE FEATURES



NOTE: THE FOLLOWING FEATURES WERE FORMERLY LOCATED ON SITE BUT HAVE SINCE BEEN REMOVED:

AREA B – CREOSOTE TREATMENT CYLINDERS
AREA I – TWO 160,000–GALLON TANKS
AREA J – ABOVEGROUND RAILCAR
AREA K – BURIED RAILCAR
AREA L – CUTOFF TANKS
AREA M – JENNITE BUILDING.

SOURCE: REVISED FROM WOODWARD–CLYDE CONSULTANTS, 1988

FIGURE 2–2
SITE LAYOUT MAP

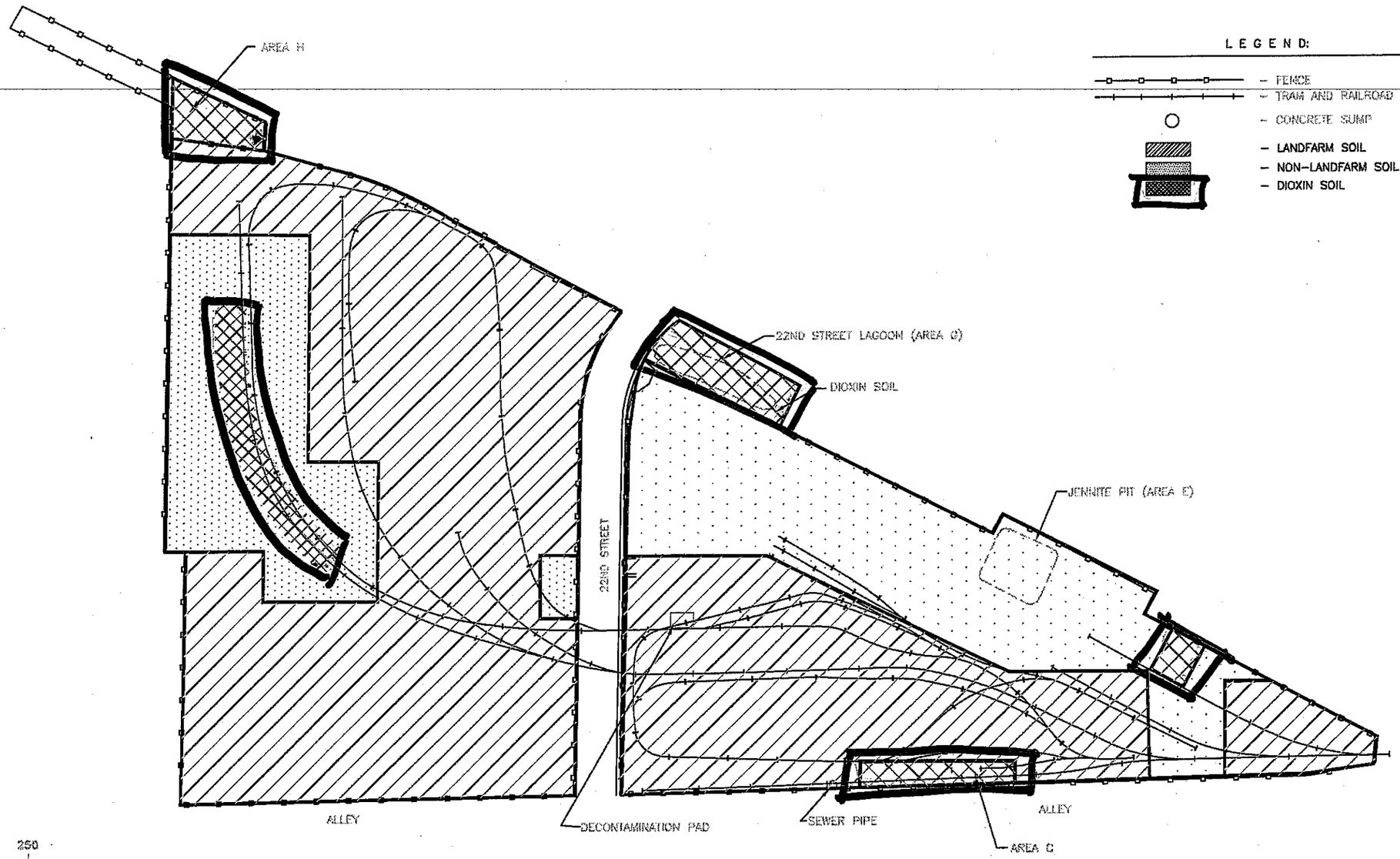
JENNISON–WRIGHT SITE
GRANITE CITY, MADISON COUNTY, ILLINOIS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1" = 100'	02/2011	Features.DWG	2	

ATTACHMENT F

SOIL CONTAMINATION AREAS

G:\...\..IE01\IE1P001B.DWG/RES/05-02-2003/CHICAGO,IL



LEGEND:

- FENCE
- TRAM AND RAILROAD LINE LOCATIONS
- CONCRETE SUMP
- LANDFARM SOIL
- NON-LANDFARM SOIL
- DIOXIN SOIL

SCALE IN FEET:

0 100 250

ecology and environment engineering of illinois, p.c.
International Specialists in the Environment

DESIGNED BY	CHECKED BY
T. CAMPBELL	C. LIN
DRAWN BY	APPROVED BY
R. SLAUGHTER	N. BROWN

NO.	DATE	DRN	APP'D	DESCRIPTION

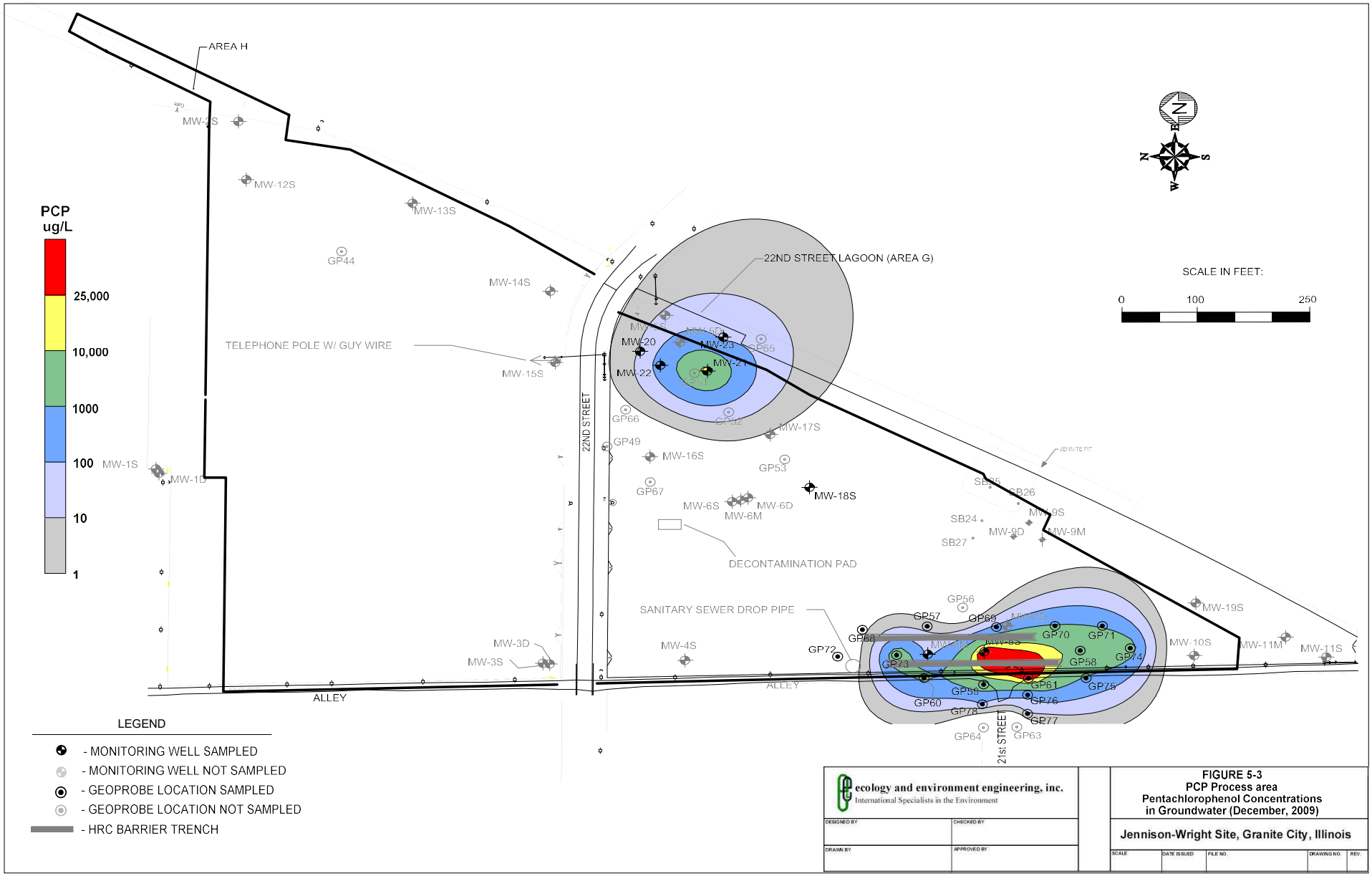
REVISIONS

SURFACE SOIL EXCAVATIONS
JENNISON-WRIGHT SITE
GRANITE CITY, MADISON COUNTY, ILLINOIS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
SEE ABOVE	APR 2005	IE1P001B.DWG	3	

ATTACHMENT G

AREAS OF PCP-CONTAMINATED GROUNDWATER



ecology and environment engineering, inc.
International Specialists in the Environment

DESIGNED BY | CHECKED BY
DRAWN BY | APPROVED BY
SCALE | DATE ISSUED | FILE NO. | DRAWING NO. | REV.

FIGURE 5-3
PCP Process area
Pentachlorophenol Concentrations in Groundwater (December, 2009)

Jennison-Wright Site, Granite City, Illinois

ATTACHMENT H

SITE PHOTOS

Table 2-1 Cleanup Objectives (CUOs)

	Proposed CUO (µg/kg)	Illinois EPA TACO Tier 1 (µg/kg)
Soil COPC		
Benzene	3,000[a]	2,100
Benzo(a)anthracene	14,000[b]	170,000
Benzo(a)pyrene	2,000[c]	17,000
Benzo(b)fluoranthene	22,000[c]	170,000
Benzo(k)fluoranthene	32,000[b]	1,700,000
Naphthalene	27,000[a]	8,200,000
Carbazole	954,000[c]	None
Dibenzo(a,h)anthracene	2,000[c]	17,000
Indeno(1,2,3-cd)pyrene	11,000[b]	170,000
PCP	51,000[b]	520,000
TCDD-TEF	1	None
Groundwater COPC		
Arsenic	50	50
Benzene	10	5.0
Benzo(a)anthracene	0.13	0.13
Benzo(b)fluoranthene	0.18	0.18
Benzo(k)fluoranthene	0.4	0.17
Chrysene	4	1.5
PCP	1.0	1.0
alpha-BHC	0.03	0.03
Manganese	200	None
Naphthalene	400	25
2,4-Dimethylphenol	200	140
2-Methylphenol	500	350

Source: Jennison-Wright Site Record of Decision September 29, 1999.

[a] CUO is based on the construction worker scenario using 1999 TACO values.
[b] CUO is based on the estimated soil saturation concentration using 1999 TACO values.
[c] CUO is based on the permanent site worker scenario using 1999 TACO values.

Key:
µg/L = Micrograms per liter.
µg/kg = Micrograms per kilogram .
TACO = Tiered approach to corrective action objectives.

ATTACHMENT I

CLEANUP OBJECTIVES

Jennison-Wright Site

Parking lot and treatment building on southern portion of Site

Drummed NAPL for off-site disposal

Water storage tanks

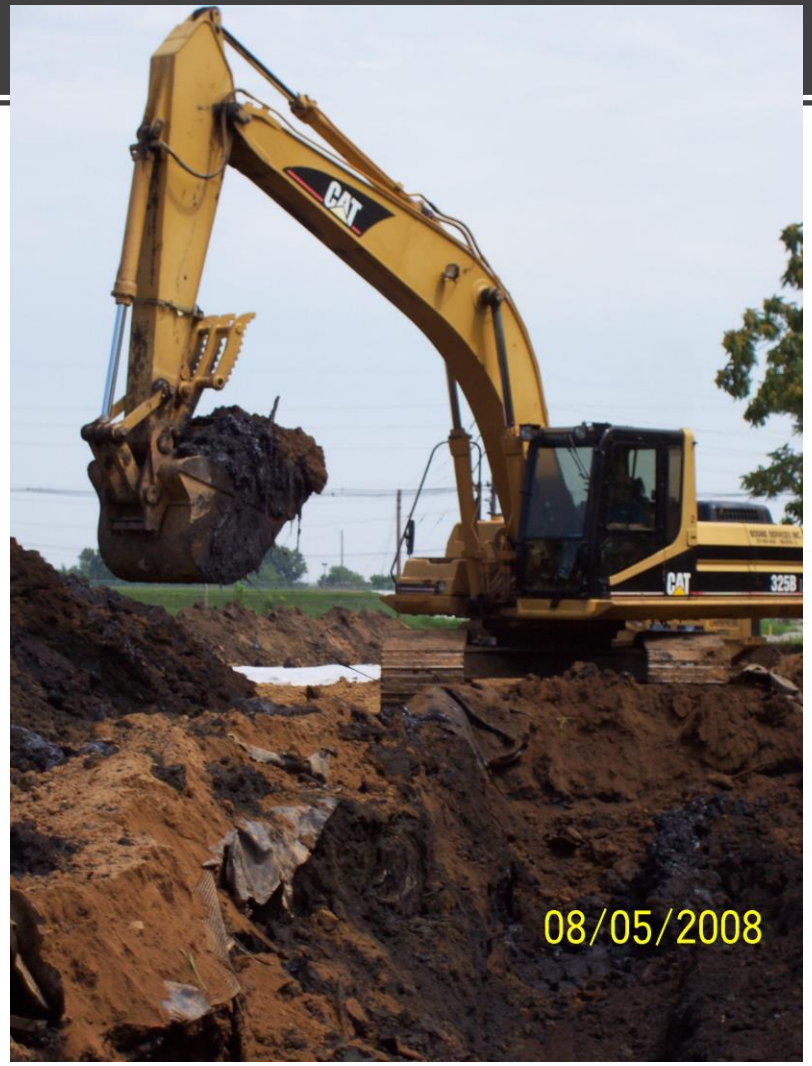
Monitoring wells with railyard in background

Left background: Illinois-American Water Company
Right background: Norfolk and Southern railyard

Residential area to the west

Retention basin on southern portion of Site

Excavation of Jennite® Pit in 2008



ATTACHMENT J

GRANITE CITY DRINKING WATER ORDINANCE

STATE OF ILLINOIS)
COUNTY OF MADISON) SS
CITY OF GRANITE CITY)

CERTIFICATION

I, JUDY J. WHITAKER, City Clerk of the City of Granite City, Madison County, Illinois, do hereby certify that the foregoing pages constitute a true Ordinance No. 7529 of said City, passed and approved on this 17th day of July, 2001 and the same was signed and approved by the Mayor of said City on the 17th of July, 2001.

I DO FURTHER CERTIFY that said Ordinance has been spread at length upon the permanent records of said City, where it now appears and remains in effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said City this 18th day of July, 19 2001.

Judy J. Whitaker
CITY CLERK

(SEAL)

ORDINANCE NO. 7529

AND ORDINANCE PROHIBITING THE USE OF GROUNDWATER AS A POTABLE WATER SUPPLY BY THE INSTALLATION OR USE OF POTABLE WATER SUPPLY WELLS OR BY ANY OTHER METHOD

WHEREAS, certain properties in the City of Granite City, Illinois, have been used over a period of time for commercial/industrial purposes; and

WHEREAS, because of said use, concentrations of certain chemical constituents in the groundwater beneath the City may exceed Class I groundwater quality standards for potable resource groundwater as set forth in 35 Illinois Administrative Code 620 or Tier 1 residential remediation objectives as set forth in 35 Illinois Administrative Code 742; and

WHEREAS, the city of Granite City desires to limit potential threats to human health from groundwater contamination while facilitating the redevelopment and productive use of properties that are the source of said chemical constituents.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GRANITE CITY AS FOLLOWS:

Section 1. **Use of Groundwater as potable water supply prohibited.** Except for such uses or methods in existence before the effective date of this ordinance, the use or attempt to use as a potable water supply groundwater from within the corporate limits of the City of Granite City by the installation or drilling of wells or by any other method is hereby prohibited, including at points of withdrawal by the City of Granite City.

Section 2. **Penalties.** Any person violating the provisions of this ordinance shall be subject to a fine of up to $750.00 for each violation, except that the City itself shall not be liable under any circumstances.

Section 3. Definitions. "Person" is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their legal representatives, agents or assigns.

"Potable Water" is any water used for human or domestic consumption, including, but not limited to, water used for drinking, bathing, swimming, washing dishes, or preparing foods.

Section 4. Memorandum of Understanding. As this Ordinance applies to the City of Granite aCity, no Memorandum of Understanding is required.

Section 5. Repealer. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed insofar as they are in conflict with this ordinance.

Section 6. Severability. If any provision of this ordinance or its application to any person or under any circumstances is adjudged invalid, such adjudication shall not affect the validity of the ordinance as a whole or of any portion not adjudged invalid.

Section 7. Effective Date. This ordinance shall be in full force and effect from an after its passage approval and publication as required by law.

PASSED by the City Council of the City of Granite City, Illinois, this 17th day of July, 2001.

APPROVED by the Mayor of the City of Granite City, Illinois, this 17th day of July, 2001.

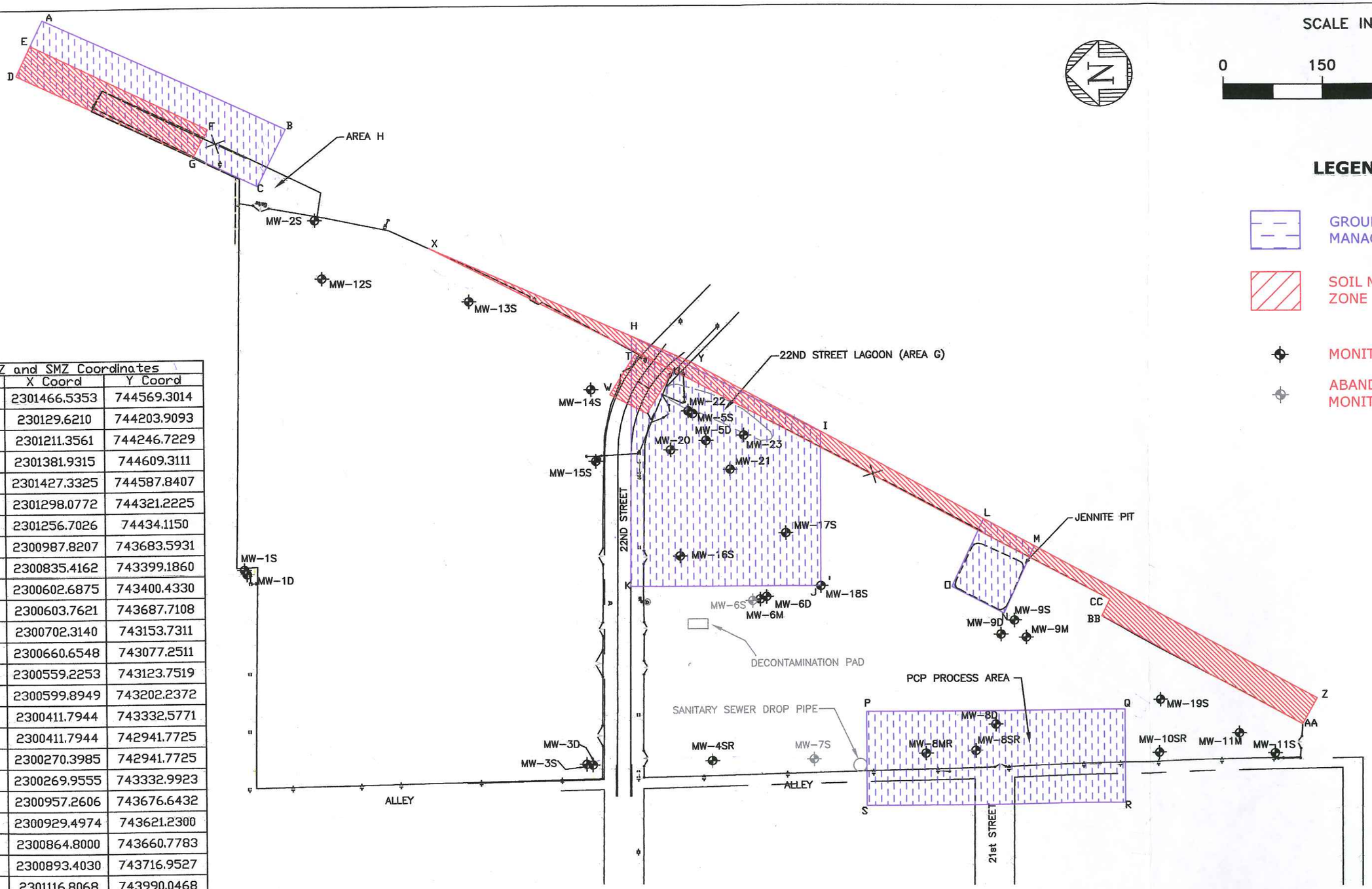
MAYOR

ATTEST:

City Clerk

ATTACHMENT K

INSTITUTIONAL CONTROL AREAS



SCALE IN FEET:

0 150 375

LEGEND

- GROUNDWATER MANAGEMENT ZONE
- SOIL MANAGEMENT ZONE
- MONITORING WELL
- ABANDONED MONITORING WELL

GMZ and SMZ Coordinates		
Point	X Coord	Y Coord
A	2301466.5353	744569.3014
B	230129.6210	744203.9093
C	2301211.3561	744246.7229
D	2301381.9315	744609.3111
E	2301427.3325	744587.8407
F	2301298.0772	744321.2225
G	2301256.7026	74434.1150
H	2300987.8207	743683.5931
I	2300835.4162	743399.1860
J	2300602.6875	743400.4330
K	2300603.7621	743687.7108
L	2300702.3140	743153.7311
M	2300660.6548	743077.2511
N	2300559.2253	743123.7519
O	2300599.8949	743202.2372
P	2300411.7944	743332.5771
Q	2300411.7944	742941.7725
R	2300270.3985	742941.7725
S	2300269.9555	743332.9923
T	2300957.2606	743676.6432
U	2300929.4974	743621.2300
V	2300864.8000	743660.7783
W	2300893.4030	743716.9527
X	2301116.8068	743990.0468
Y	2300943.3106	743596.1651
Z	2300427.1791	742648.6242
AA	2300387.9228	742670.6893
BB	2300553.5625	742975.6513
CC	2300578.5870	742963.4535

FIGURE 1-1
Institutional Control Areas

JENNISON-WRIGHT SITE
GRANITE CITY, MADISON COUNTY, ILLINOIS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
SEE ABOVE	01/2010	ICIP_120909.DWG	1	

\\Chibdf1\CAD\Illinois EPA\JW\GW_FSP 120909.dwg

ATTACHMENT L

PUBLIC NOTICE AD

Local news and events

COLLINSVILLE

Library events

Weekly events at the Collinsville Memorial Library Center, 408 W. Main St., in Collinsville, include — Adult Coloring all day, everyday; Baby Boogie at 9:30 a.m. on Wednesdays; Yoga Time at 6:30 p.m. on Wednesdays; Video Game Club at 6 p.m. on Thursdays; Meditation Meetings at 10 a.m. on Saturdays; Preschool Storytime at 10 a.m. on Tuesdays; and Open Gaming at 4 p.m. on Tuesdays.

For more information on events, call the library at 618-344-1112 or visit the online event calendar at mvld.org.

Recycling Drop Off

The next Collinsville Electronics and Appliance Recycling Drop Off event will take place from 12 to 6 p.m. May 11, in the public parking lot at 227 W. Main St. (across from Spiritos Italian Grocery), in Collinsville.

Gateway Center events

Upcoming events at Gateway Center, One Gateway Dr., in Collinsville include — Collinsville Area Women's Connection from 12:15 to 2 p.m. May 14.

All event dates, times and admission fees are subject to change without notice. Parking is complimentary at Gateway Center.

For more information, call 618-345-8998 or 800-289-2388 or visit GatewayCenter.com.

Support group

St. John's Community Care will host a free Alzheimer's Support Group from 1:30 to 3 p.m. May 14, at its location at 222 Goethe St., in Collinsville.

Join others dealing with dementia and memory loss. Complimentary care for loved ones available with reservation.

For more information, call 618-344-5008.

Camelot Cribbage Club

The Camelot Cribbage Club will meet at 6:30 p.m. May 14, at Camelot Bowl, 801 Belt Line Road, in Collinsville.

Play seven games against seven different opponents every Tuesday. Beginners are welcome.

For more information, call Phil 618-288-7910 or Susan at 618-656-8809.

Collinsville Area Camera Club

The Collinsville Area Camera Club will meet from 7 to 9 p.m. May 14, at the Collinsville Area Recreation District Building, 10 Gateway Dr., in Collinsville.

For more information, contact club president Tom Hegeman at 618-402-8811 or visit collinsvilleareacameraclub.com.

EDWARDSVILLE

go/10c0a4aacae28a4fa7-mothers.

For more information on this or any other EAC class, call 618-655-0337 or e-mail office@edwardsvilleartscenter.com.

Wildey Theatre events

Upcoming events at the Wildey Theatre, 252 N. Main St., in Edwardsville, include "Journeyman — A Tribute to Eric Clapton" at 8 p.m. May 10; and "Martin Barre's 50 Years of Jethro Tull Celebration" at 8 p.m. May 17-18.

Check out these and other events at wildeytheatre.com and like them on Facebook.

Girl Scouts summer camp

The registration deadline for the Girl Scouts summer camp "Hungry Games Beach Party," sponsored by Service Unit 102 Granite City, is May 15.

The camp is for Daisies-Ambassadors (grades K-12) and will be from 6 to 9 p.m. June 17-21, at Camp Torqua, in Edwardsville.

The camp fee is $50 with an overnight option of $5.

For more information, visit gsofsi.org, call 1-800-345-6858 or e-mail Lynette Melton-Wolfe at lynettemeltonwolfe@gmail.com.

Family Caregiver Support Group

St. John's Community Care will host a Family Caregiver Support Group from 6:30 to 8 p.m. May 15, at its Adult Day Program, 1015B Century Dr., in Edwardsville.

This support group is intended for family caregivers caring for loved ones with any type of disability.

For more information, call 618-656-7090.

GLEN CARBON

Library events

The Glen Carbon Library, 198 S. Main. St., in Glen Carbon, has these upcoming events:

• "Girls Who Code" will be at 6:30 p.m. May 8. Young people ages 8-18 (not just girls) will meet to gain skills in programming, robotics and web design.

• The "Independent Learning Library" will be at 1 p.m. May 9. One-hour sessions will provide youths with hands-on experiences in computer programming, fine arts, history and STEAM-related subjects.

• "Project Next Generation" will be at 4:30 p.m. May 9. Through a PNG grant, kids are offered a chance to explore coding and robotics.

• "Stitchin' in the Stacks" will be from 2 to 4 p.m. May 10. Do you like to knit? Crochet? Embroider? Whatever your passion, gather and socialize with others who share your interest and perhaps pick up a few tips and tricks as you work your own creations. Please bring your sewing supplies. This is a self-directed program, there is no instructor.

• Yoga will be from 9:30 to 10:30 a.m. May 11. Get fit and healthy when you join us for a calming session of yoga. Please bring your own yoga mat.

• "Pop Up Pop Art" for youths will be at 1 p.m. May 11.

• The "Parent and Child Tea Party" will be at 1 p.m. May 11. The Edwardsville High School Drama Club will perform a student created skit. Crafts and activities and refreshments will be included during this family celebration day. Registration is required.

• "Book Club" will be from 6:30 to 7:30 p.m. May 14, to discuss the book "The Language of Flowers" by Vanessa Diffenbaugh. Newcomers are always welcome.

For more information or to register, call 618-288-1212, stop by the Help Desk or visit glencarbonlibrary.org.

Glen Carbon Seniors Group

The Glen Carbon Seniors Group will meet from 12:30 to 3 p.m. May 14, at the Glen Carbon Senior/Community Center, 157 N. Main St., in Glen Carbon.

Join them each Tuesday for fun and fellowship, card and table games and shuffleboard when weather permits.

For more information, call Russ Marti at 618-288-3165, Bill Newman at 618-288-7748 or Peggy Watson at 618-692-1714.

Masonic Lodge Breakfast

The Edwardsville Masonic Lodge Breakfast, consisting of pancakes and sausage with scrambled eggs, will be from 7 to 11 a.m. May 25, at the Edwardsville Masonic Lodge, 90 Kriege Farm Road, in Glen Carbon (behind Walmart).

You have the choice to eat in or carry out. The cost is $7 for adults, $3 for children ages 4 to 10 and free for children 3 and under.

For more information, call 618-656-7137.

MARYVILLE

Grief Support Group at Anderson

Anderson Hospital, 6800 State Route 162, in Maryville, will offer a Grief Support Group at 7 p.m. May 14, in the Hospital Chapel.

All are welcome to come and share their grief in this comfortable, group setting. Visit with others who share the same feelings you do and understand the hurt and loss you are experiencing.

TROY

Library holds book sale

The Tri Township Library, 209 S. Main, in Troy, will hold a book sale from 9 a.m. to 12 p.m. May 18.

Books, magazines, puzzles, games, DVDs and CD donations are accepted during regular library hours or on the day of the sale. The book sale is sponsored by the Friends of the Library.

For more information, call the library at 618-667-2133.

Jennison Wright Five Year Review Notice

The Illinois Environmental Protection Agency (Illinois EPA) and United States Environmental Protection Agency (USEPA) are conducting the third five-year review of the Jennison-Wright Superfund site located at 900 West 22nd Street, Granite City, Illinois. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires regular reviews of sites (at least every five years) where cleanup is underway and hazardous waste remains on site. The reviews are done to ensure that the cleanup continues to protect human health and the environment.

This is the third such review since remedial action work began on June 15, 2004 and it will evaluate current site conditions and look at the overall effectiveness of the cleanup actions. Illinois EPA conducted at five-year review site inspection on January 4, 2019. Currently, there is a technical review of data and documents being conducted. The review report is expected to be completed and be made available to the public in June 2019. The Granite City Public Library will be provided a copy and will also be available by searching the following website: https://www.epa.gov/superfund/search-superfund-five-year-reviews

The five-year review also gives local community members the opportunity to voice their concerns and ask questions about site conditions and clean-up efforts. Anyone seeking further information or to discuss the Jennison-Wright site or the five-year review process should contact:

Jennison Wright Five Year Review Notice

The Illinois Environmental Protection Agency (Illinois EPA) and United States Environmental Protection Agency (USEPA) are conducting the third five-year review of the Jennison-Wright Superfund site located at 900 West 22nd Street, Granite City, Illinois. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires regular reviews of sites (at least every five years) where cleanup is underway and hazardous waste remains on site. The reviews are done to ensure that the cleanup continues to protect human health and the environment.

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The five-year review also gives local community members the opportunity to voice their concerns and ask questions about site conditions and clean-up efforts. Anyone seeking further information or to discuss the Jennison-Wright site or the five-year review process should contact:

Christopher Hill	Mary Tierney	Jay Timm
Remedial Project Manager	Remedial Project Manager	Community Relations Coordinator
Illinois EPA	U.S. EPA	Illinois EPA
P.O. Box 19276	77 West Jackson Blvd.	P.O. Box 19276
Springfield, Illinois 62794	Chicago, Illinois 60604	Springfield, Illinois 62794
217.782.9292	312.886.4785	217.557.4972
christopher.hill@illinois.gov	tierney.mary@epa.gov	jay.timm@illinois.gov

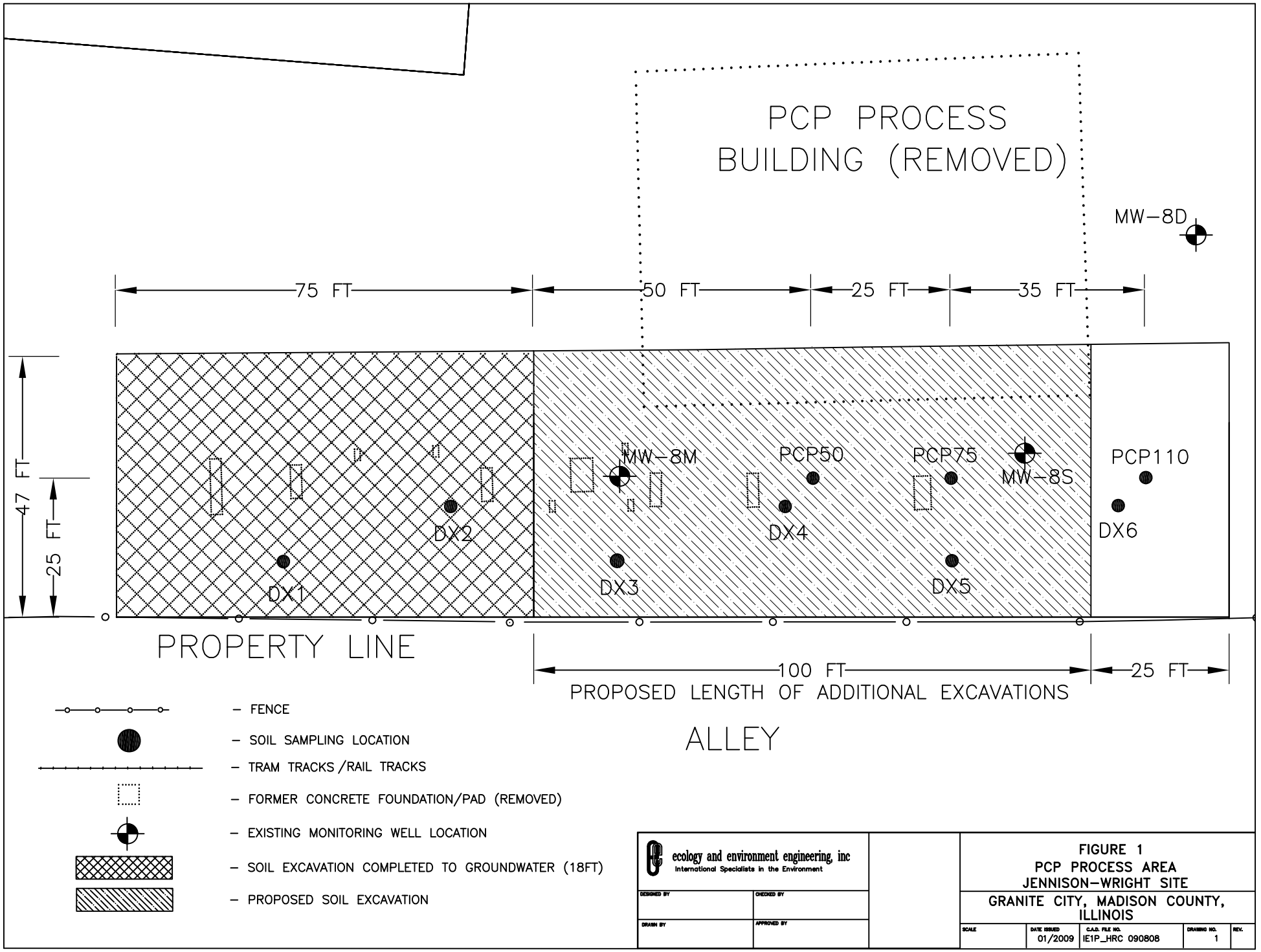
In 1992, Illinois EPA took actions to alleviate the spread of contamination and to stabilize the site. In 1994, a removal action was conducted, which included removing and properly disposing of approximately 175 drums of chemicals, removal of waste material from on-site storage vessels, construction of a protective cap over a portion of the site, and excavation of some contaminated soils. The Jennison-Wright site underwent further cleanup to address residual soil contamination and waste disposal pits. The groundwater treatment system was completed in September 2009 and continues to operate on the southern half of the site.

Site information may be reviewed at the Granite City Public Library, 2001 Delmar Avenue, Granite City, Illinois 62040. The next five-year review will be conducted in 2024.

5/8/2019
Madison County Edition

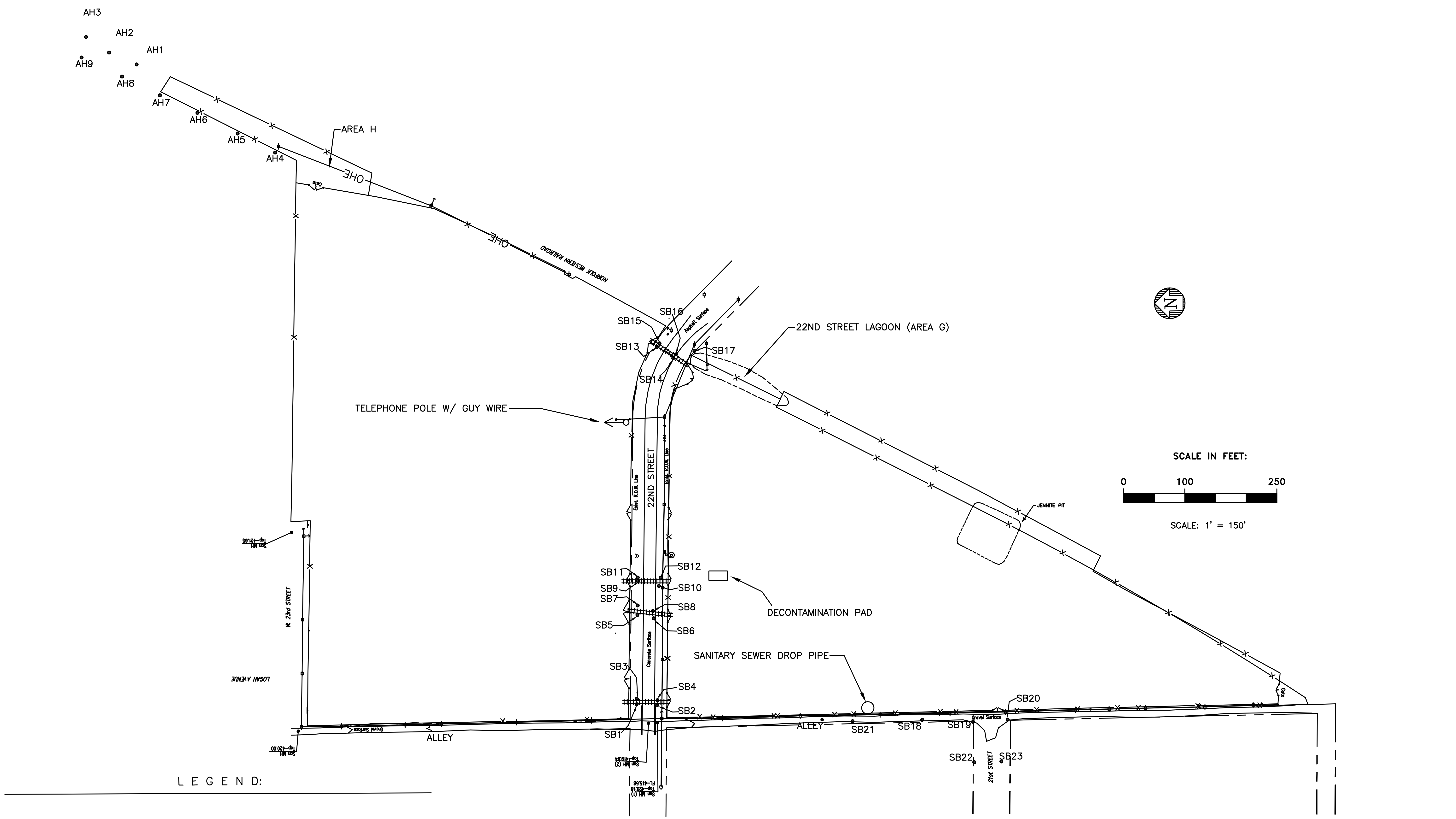
ATTACHMENT M

SOIL SAMPLING LOCATIONS AND PROPOSED EXCAVATION AREA FOR PCP PROCESS AREA


PCP PROCESS
BUILDING (REMOVED)
MW-8D
75 FT
50 FT
25 FT
35 FT
47 FT
25 FT
MW-8M
PCP50
PCP75
MW-8S
PCP110
DX1
DX2
DX3
DX4
DX5
DX6
PROPERTY LINE
100 FT
25 FT
PROPOSED LENGTH OF ADDITIONAL EXCAVATIONS
ALLEY
– FENCE
– SOIL SAMPLING LOCATION
– TRAM TRACKS /RAIL TRACKS
– FORMER CONCRETE FOUNDATION/PAD (REMOVED)
– EXISTING MONITORING WELL LOCATION
– SOIL EXCAVATION COMPLETED TO GROUNDWATER (18FT)
– PROPOSED SOIL EXCAVATION
ecology and environment engineering, inc
International Specialists in the Environment
DESIGNED BY
CHECKED BY
DRAWN BY
APPROVED BY
FIGURE 1
PCP PROCESS AREA
JENNISON-WRIGHT SITE
GRANITE CITY, MADISON COUNTY, ILLINOIS
SCALE
DATE ISSUED 01/2009
C.A.D. FILE NO. IE1P_HRC 090808
DRAWING NO. 1
REV.

ATTACHMENT N

SOIL SAMPLING LOCATIONS OUTSIDE OF PCP PROCESS AREA



L E G E N D:

● – SOIL SAMPLE LOCATION

ecology & environment engineering, inc.
International Specialists in the Environment

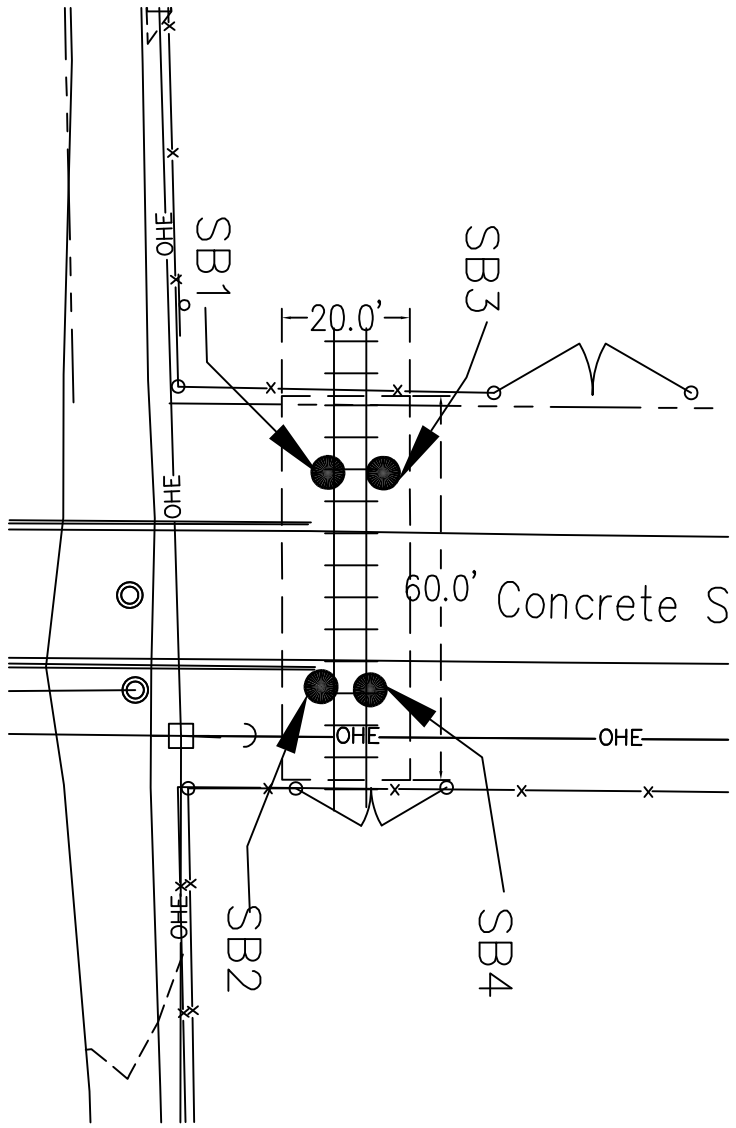
FIGURE 1
2008 SOIL SAMPLE LOCATION

JENNISON–WRIGHT SITE
GRANITE CITY, ILLINOIS

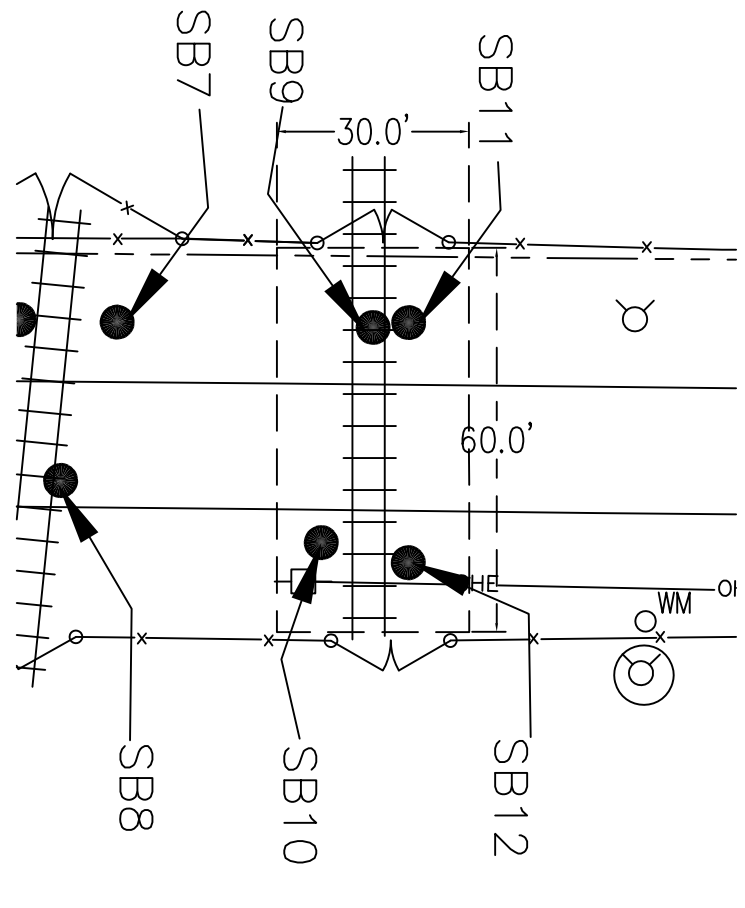
DESIGNED BY: T. CAMPBELL	CHECKED BY: J. JENKINS			
DRAWN BY: V.GEE	APPROVED BY: N. BROWN			
SCALE: SEE ABOVE	DATE ISSUED: 01/2009	C.A.D. FILE NO.: IE1P_GP_FSP 012109	DRAWING NO.: 1	REV.:

ATTACHMENT O

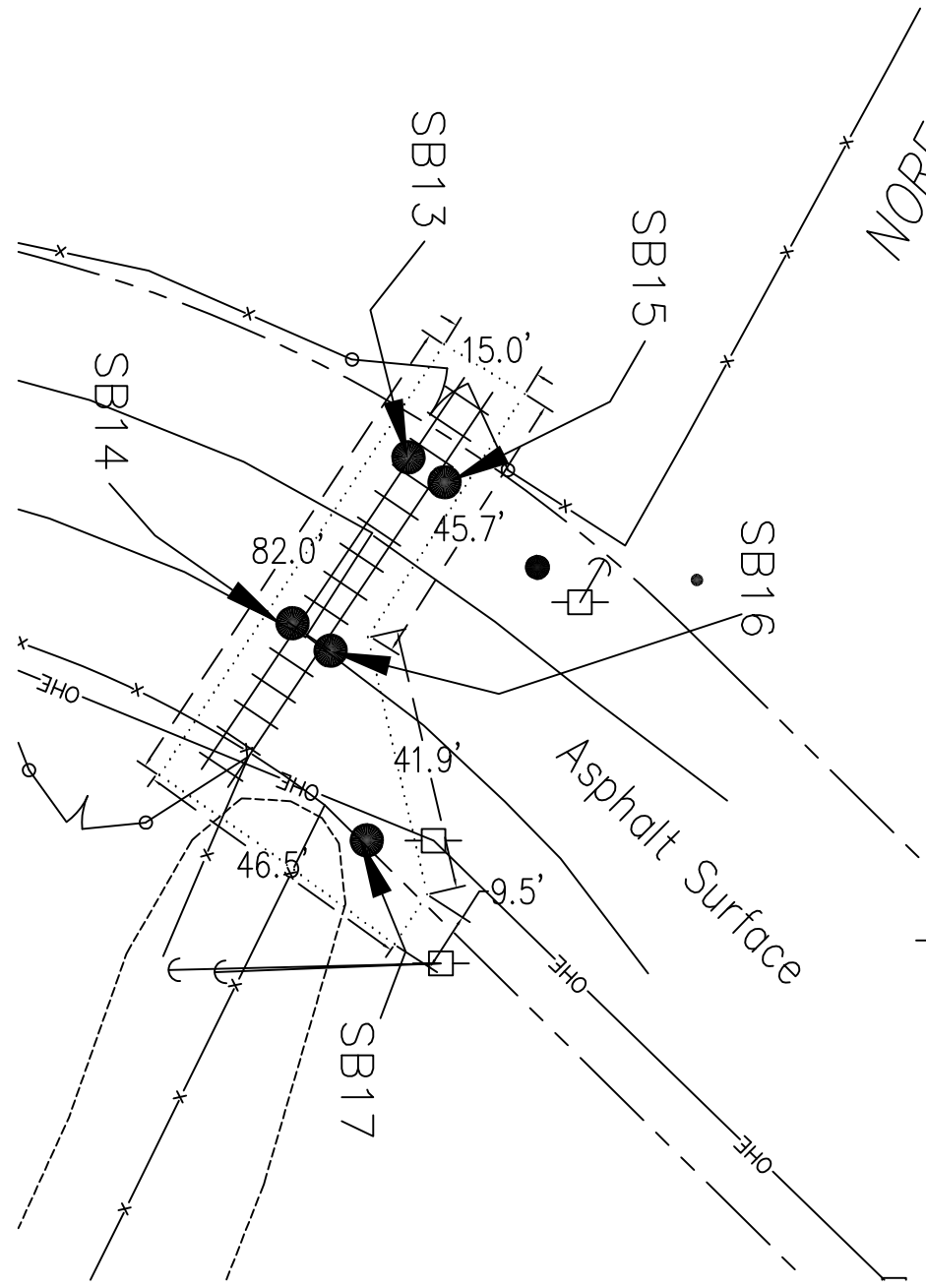
PROPOSED EXCAVATION AREAS OUTSIDE OF PCP PROCESS AREA



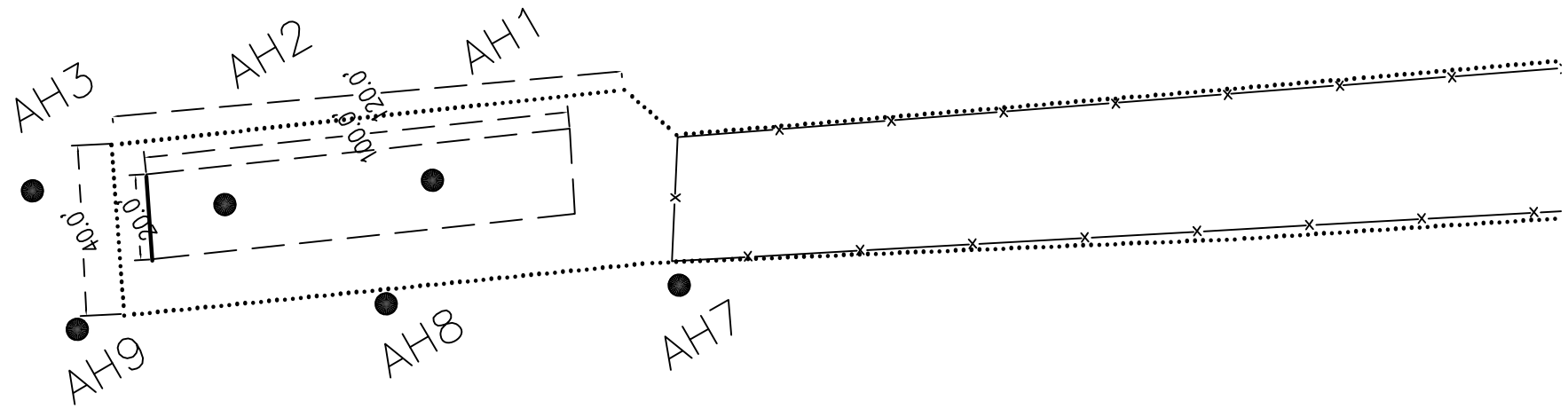
SCALE: 1' = 30'



SCALE: 1' = 30'



SCALE: 1' = 30'



SCALE: 1' = 40'

L E G E N D:

- SOIL SAMPLE LOCATION
- PROPOSED SOIL REMOVAL
- INSTITUTIONAL CONTROLS

ecology & environment engineering, inc.
International Specialists in the Environment

FIGURE 2
PROPOSED SOIL REMEDIATION

DESIGNED BY	CHECKED BY
T. CAMPBELL	J. JENKINS
DRAWN BY	APPROVED BY
V.GEE	N. BROWN

JENNISON–WRIGHT SITE
GRANITE CITY, ILLINOIS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
SEE ABOVE	01/2009	IE1P_GP_FSP 021605	1	

ATTACHMENT P

MONITORING WELL LOCATIONS

MW–2S

MW–12S

MW–13S

MW–14S

22ND STREET LAGOON (AREA G)

SCALE IN FEET:

0 100 250

MW–5S

MW–5D

MW–20

MW–23

TELEPHONE POLE W/ GUY WIRE

MW–15S

MW–22

MW–21

22ND STREET

MW–17S

MW–16S

JENNITE PIT

MW–18S

MW–6S

MW–6D

MW–6M

MW–9S

MW–9D

MW–9M

MW–1D

DECONTAMINATION PAD

SANITARY SEWER DROP PIPE

MW–19S

MW–8D

MW–3D

MW–3S

MW–4S

MW–8M

MW–8S

MW–10S

MW–11M

MW–11S

ALLEY

ALLEY

1st STREET

FIGURE 5–1
GROUNDWATER SAMPLING LOCATIONS

JENNISON–WRIGHT SITE
GRANITE CITY, MADISON COUNTY, ILLINOIS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
SEE ABOVE	2/2011		1	

ATTACHMENT Q

GROUNDWATER DATA – OCTOBER 2018

REACT Project Number: 8382.03.17
Lab Results Reported in mg/L

Jennison Wright Well Analytical Results
Fourth Quarter 2018

Well	2-Methylnapthalene	Acenaphthene	Dibenzofuran	Flourene	Naphthalene	Pentachlorophenol	Phenanthrene	2,4-Dichlorophenol	2,4-Dimethylphenol	Carbazole	Analine	Acenaphthylene
5D	ND	ND	ND	ND	30	ND	ND	ND	ND	ND	ND	ND
5S	295	261	150	130	10,600	714	110	ND	358	450	ND	26
6M	ND	1	ND	ND	15	33	ND	ND	ND	4	ND	ND
6D	7	5	3	3	120	67	1	ND	ND	22	ND	ND
8M	ND	69	ND	13	44	8	ND	ND	ND	22	ND	ND
8S	140	ND	ND	ND	110	42,600	ND	ND	ND	ND	ND	ND
17S	250	100	53	46	ND	130	ND	ND	ND	470	ND	ND
18S	ND	ND	ND	ND	5,220	1,650	ND	ND	ND	81	ND	ND
20	ND	66	ND	30	804	ND	ND	ND	ND	ND	ND	ND
21	214,000	89,400	62,400	79,400	298,000	154,000	267,000	ND	ND	ND	ND	6,300
22	294,000	293	180	140	7,890	50	150	68	382	410	ND	ND
23	ND	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

REACT Project Number: 8382.03.17
Lab Results Reported in mg/L

Jennison Wright Well Analytical Results
Fourth Quarter 2018

Well	Anthracene	Fluoranthene	Pyrene	Phenol	Benzo(a)anthracene	Benzo(b)fluoranthene	Chrysene
5D	ND	ND	ND	ND	ND	ND	ND
5S	ND	ND	ND	ND	ND	ND	ND
6M	ND	ND	ND	ND	ND	ND	ND
6D	ND	ND	ND	ND	ND	ND	ND
8M	ND	ND	ND	ND	ND	ND	ND
8S	ND	ND	ND	ND	ND	ND	ND
17S	ND	ND	ND	ND	ND	ND	ND
18S	ND	ND	ND	ND	ND	ND	ND
20	ND	ND	ND	ND	ND	ND	ND
21	35,000	132,000	104,000	ND	30,000	20,000	25,000
22	ND	ND	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	ND	ND	ND

ATTACHMENT R

SITE INSPECTION CHECKLIST

Appendix D
Five-Year Review Site Inspection Checklist

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Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

I. Site Information
II. Interviews
III. On-site Documents & Records Verified
IV. O&M Costs
V. Access and Institutional Controls
VI. General Site Conditions
VII. Landfill Covers
VIII. Vertical Barrier Walls
IX. Groundwater/Surface Water Remedies
X. Other Remedies
XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: JENNISON-WRIGHT SUPERFUND SITE	**Date of inspection:** JANUARY 4, 2019
Location and Region: GRANITE CITY, IL, REGION 5	**EPA ID:** ILD006282479
Agency, office, or company leading the five-year review: ILLINOIS EPA	**Weather/temperature:** 39°F, OVERCAST

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** TONY WARREN, REACT (Name) OPERATIONS MANAGER (Title) JAN 4, 2019 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached RECOMMENDS FURTHER ADJUSTMENT OF GROUNDWATER HEATING AND EXTRACTION SYSTEM TO OPTIMIZE PERFORMANCE.

2. **O&M staff** _____ _____ _____
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
Problems, suggestions; ☐ Report attached _____
_____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☒ As-built drawings — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Maintenance logs — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks DRAWINGS ARE CURRENT FOR WORK REACT HAS CONDUCTED. ORIGINAL AS-BUILTS CANNOT BE LOCATED.

2. **Site-Specific Health and Safety Plan** — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Contingency plan/emergency response plan — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks

3. **O&M and OSHA Training Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☒ Waste disposal, POTW — ☒ Readily available — ☒ Up to date — ☐ N/A
   - ☒ Other permits LANDFILL DISPOSAL PERMIT — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks SIX YEARS OF DATA FROM 2013 THROUGH 2018 PROVIDED.

8. **Leachate Extraction Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks SVOC MASS BALANCE DATA PROVIDED

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks

IV. O&M COSTS

1. **O&M Organization**
   - ☐ State in-house
   - ☒ Contractor for State
   - ☐ PRP in-house
   - ☐ Contractor for PRP
   - ☐ Federal Facility in-house
   - ☐ Contractor for Federal Facility
   - ☐ Other _____

2. **O&M Cost Records**
   - ☒ Readily available
   - ☒ Up to date
   - ☒ Funding mechanism/agreement in place
   - Original O&M cost estimate _____ ☐ Breakdown attached

   Total annual cost by year for review period if available

   From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached
   From _____ (Date) To _____ (Date) _____ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: UPGRADE ASSOCIATED WITH INSTALLATION OF LARGER OWS AND EQUIPMENT, APPROXIMATELY $523,000.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A
   Remarks APPROXIMATELY 75% OF PERIMETER FENCING REPLACED SINCE LAST FIVE-YEAR REVIEW. NO CURRENT BREACHES.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
   Remarks SIGNAGE PRESENT ON FENCING

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☒ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

INSTITUTIONAL CONTROLS NEEDED. DISCUSSED IN FIVE-YEAR REVIEW REPORT.

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks NOTE REMARKS IN ITEM 1 ABOVE.

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks TRESPASSING REMEDIED BY FENCE REPAIR.

2. **Land use changes on site** ☒ N/A

Remarks

3. **Land use changes off site** ☒ N/A

Remarks

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   - ☐ Wet areas ☐ Location shown on site map Areal extent_____
   - ☐ Ponding ☐ Location shown on site map Areal extent_____
   - ☐ Seeps ☐ Location shown on site map Areal extent_____
   - ☐ Soft subgrade ☐ Location shown on site map Areal extent_____

   Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
   Areal extent_____
   Remarks_____

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
   Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
   Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
   Remarks_____

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks GOOD CONDITION WITH REGULAR MAINTENANCE.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☒ Good condition ☐ Needs Maintenance
   Remarks GOOD CONDITION WITH REGULAR MAINTENANCE

3. **Spare Parts and Equipment**
   ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   - ☐ Metals removal ☒ Oil/water separation ☐ Bioremediation
   - ☐ Air stripping ☒ Carbon adsorbers
   - ☒ Filters OIL FILTER-ORGANO CLAY, ACTIVATED CARBON
   - ☒ Additive (*e.g.*, chelation agent, flocculent) BIOCIDE / AN400 / AN 310 H
   - ☐ Others
   - ☒ Good condition ☐ Needs Maintenance
   - ☒ Sampling ports properly marked and functional
   - ☒ Sampling/maintenance log displayed and up to date
   - ☒ Equipment properly identified
   - ☒ Quantity of groundwater treated annually CIRCULATED
   - ☐ Quantity of surface water treated annually
   - Remarks

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☐ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ONE OLD PANEL NEEDS UPGRADE FOR WET ENVIRONMENT.

3. **Tanks, Vaults, Storage Vessels**
   - ☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs Maintenance
   - Remarks

4. **Discharge Structure and Appurtenances**
   - ☐ N/A ☒ Good condition ☐ Needs Maintenance
   - Remarks

5. **Treatment Building(s)**
   - ☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
   - ☒ Chemicals and equipment properly stored
   - Remarks

6. **Monitoring Wells** (pump and treatment remedy)
   - ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   - ☒ All required wells located ☐ Needs Maintenance ☐ N/A
   - Remarks

D. Monitoring Data

1. Monitoring Data
   - ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   - ☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☒ N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

WITH NEW OWS SYSTEM IS GETTING MUCH IMPROVED RECOVERY AND CONE OF DEPRESSION.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

NEED TO DEVELOP O+M PLAN TO CORRESPOND WITH SYSTEM UPGRADES.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

~~STEEL~~ LINES TO/FROM WELLS ARE BLACK IRON. NEED TO BE REPLACED TO MINIMIZE MAINTENANCE.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

REACT CURRENTLY EVALUATING SYSTEM OPTIMIZATION WITH NEW OWS.